RAILROAD GAZETTE

SATURDAY, JUNE 21, 1873.

The Railroad Question in Mexico.

The Mexican Congress has adjourned, and it appears to have left the Rosecrans project almost hopeless and the Plumb project (International) in a fair way to succeed.

From the report of Congressional proceedings for the 30th of May, contained in *El Monitor* of the following day, we translate:

"The following Communications were received: * *

"From the Minister of Fomento, with copy of the notification to General Palmer, declaring that the concession of the 10th of December, 1870, has expired.

"From the same Minister, remitting the contract entered into with the representative of the Texas Company for the establishment of the International Railroad. Referred to the Second Committee on Industry."

From the *Trait d'Union*, of May 31, we translate the following, which appears in its "Review of the Fortnight:"

Let us come to the railroad questions, which are of exceptional interest. The partisans of the Rosecrans project, numerous in Congress, made extraordinary efforts to have it adopted during this session; they have had even, under certain circumstances, a majority among the deputies; they first brought it about that an extraordinary session should be held every morning until the settlement of the question. Since the matter did not make progress as rapidly as they desired, they then demanded that the chamber should declare itself permanently in session until the final vote on the favorable report of the Committee on Industry. But, in spite of the zeal of the advocate of the project, it fell through completely, and the session has closed without any vote having been taken.

"This question of the Rosecrans project has been treated neither skillfully nor frankly; it has been managed in such a way as to render it unpopular and lose sympathy for it, and besides the general opinion was contrary to the adoption of the narrow gauge, which made its indispensable basis. The Rosecrans project has then failed completely, unless (which appears to us very unlikely) the next Congress should take it up again and give it new life.

"In compensation, the government presented to Congress yesterday a signed contract between it and Mr. Plumb, representing the International Company of Texas, for the construction of the line of railroad of wide [standard] guage from Mexico to the Pacific and from Lagos to the Rio Brano [which we call the Rio Grande]. This leads us to believe that the great railroad question is solved, and that, among other considerations, the wide [standard] gauge has prevailed over the narrow gauge.

"Congress has voted definitely the concession for the railroad which will unite, at Ometusco, the city of Pachuca to the Vera Cruz and Mexico line. This branch will be about 12 leagues [33 English miles] long, and will be of manifest utility to the mining districts which it will serve. The concession is made in favor of Mr. Justino Fernandez, Governor of the State of Hidalgo, who will receive a subsidy of $5,000 per kilometre [about $6,700 per mile], and has three years for completing the work.

"A company of capitalists has been formed in Puebla for establishing a line of railroad between that city and Matamoros Izucar. Congress voted the concession, which was approved without comment by the Executive. The line of communication will be about 17 leagues [44 miles] long, and the cost of construction will amount to about a million dollars.

"Thus then we see the impulse given for the construction of railroads in the Mexican republic. These are the first results of the completion of the line between Vera Cruz and Mexico. Let us hope that they will not be the last, and that the establishment of routes of rapid communication will soon bring the country immigration and prosperity."

Bridge Construction—A Letter from Mr. A. D. Briggs.

The Springfield (Mass.) *Republican* publishes the following letter from Mr. A. D. Briggs, of the firm which builds the Truesdell bridges:

I have no reason to complain of the criticisms which I have seen upon the articles you were so kind as to publish over my name on the 10th and 13th of May, in regard to bridge construction in general and the Dixon bridge in particular, and I only ask room for a few additional words to explain what seems not to have been made clear in my previous articles. I fully indorse the *creed* of the editor of the RAILROAD GAZETTE: (1) "That all bridges *should* be prepared to sustain the maximum load which they *may* be obliged to carry; (2) the proportion of the parts should be determined by calculating the greatest strain to which any load not exceeding the maximum *may* subject them; (3) no parts of an iron bridge should ever be subject to a strain of tension or compression greater than one-fourth of its utmost strength," and I have never built a bridge which was not calculated to be in accordance therewith. Nor am I prepared to admit that in the present state of the art "the form of the Truesdell bridge is such that it is impossible or difficult to calculate the strain which its different members must bear under a given load," and I suppose those experts who have written articles upon this subject recently will be equally unwilling to do so. I have no intention and have no desire "to raise suspicions of the safety of *all* iron bridges," for no fact is better established than that iron is eminently adapted to this branch of mechanical construction. And yet I think no one can deny that the frequent failure of iron bridges of various "patents" and patterns during the last few years is calculated and ought to weaken confidence in iron structures, and that is all that I said on that point in my previous articles. The question is not what *might* be constructed, but what *has been*, and is now in existence. That many of them are safe, most will admit; that some are otherwise, none ought to deny.

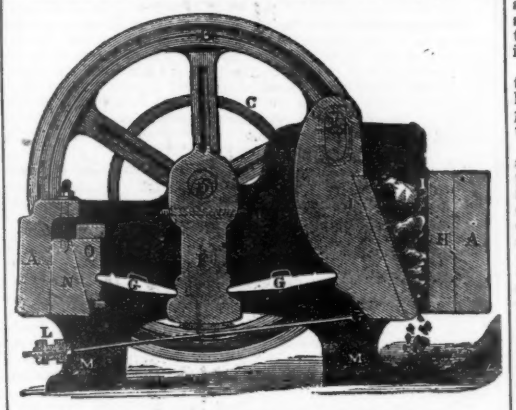
And right here I wish to say that many of the iron bridges which I have examined, although in many cases well proportioned throughout for a *light* load, seem to have been designed for a much lighter duty than they have had to perform. This is universally true of the *highway* bridges in the Northern States, where no *adequate allowance* has usually been made for the gradually accumulating weight of snow and ice in winter. One bridge of single span, which was built under a guaranty to sustain a load of *ten* tons (the laws of this State only require towns to provide bridges upon highways which will sustain a *moving load of six tons*), was at one time during the last winter found to be sustaining a load of upward of *seventy* tons *of snow and ice*, in addition to the moving traffic which it was *calculated* to bear. If all iron bridges were built with an equal "margin of strength" for safety, I should have less fear for their stability or lack of it than I now confess to. One reason why *iron* bridges are thus overloaded, while *timber* bridges are comparatively free from this danger, is, that timber bridges of any considerable length of span are usually covered, or "roofed in," and only so much snow is carried in upon the floorings as will enable sleighs, sleds, etc., to move easily upon them, while iron bridges, being open overhead, are not unfrequently loaded with snow and ice to an extent of many times the weight of ordinarily moving loads for which some of them at least seem to have been calculated, and I have no doubt that the failure of many highway bridges could be traced to injuries received by over-straining from this cause. The officers of but few towns would, I think, feel justified in paying for bridges which would be capable of sustaining *four times* the load which, as has been stated above, may come upon them during any winter in this latitude, even without any extraordinary amount of snow-fall, and hence the absolute necessity of watchfulness on their part to see that their iron bridges are not loaded to an extent far beyond what they are calculated to sustain.

The Blake Stone Crusher.

The following description of this now very well-known and widely used machine is taken from an article in the *Coal and Iron Record:*

"By examining the engravings, it will be seen that the power is transferred to the point where it is wanted in the most correct and economical manner possible. In the first place, we have two ponderous fly-wheels, one on each side, which are attached to the shaft that is driven by the prime mover—steam, water, or any other. These fly-wheels absorb the power of the motor during the time when the machine is doing no work—that is, during the backward movement of the jaws—and give it out when the stone or ore is being crushed. From this shaft the power is transmitted by two of the most efficient devices known to mechanics, the cam or eccentric and the toggle-joint. As the fly-wheel shaft revolves, the eccentric at *D* raises and lowers the pitman *F*, which is a solid block of cast iron. This motion of the pitman causes the two jaws or plates, etc., to act as a toggle-joint—one of them having a fixed bearing against the frame of the machine, and the other resting in a recess in the movable jaw at every revolution of the eccentric. Therefore, the movable jaw *J* is pressed with great force against the fixed jaw *H*, and when the toggles relax their pressure the jaw *J* falls back partly by its own weight and partly by the action of the spring *L*. The size to which the stones are crushed is regulated by the distance to which this jaw recedes. All the pieces that are small enough fall through, while those that are too large remain and are subjected to the crushing action of the next revolution.

"Further detail is obviously unnecessary, as the simplicity of the machine is such that its construction in every part will



be readily understood by an inspection of the engraving. Moreover, the absence of all complicated details enables manufacturers to construct the machine of solid castings of great strength and comparatively small expense. In addition to this, it may be noted that those parts which are liable to wear out can be replaced by more castings and plates, which are put in place as easily as a new grate to a stove. These parts are the jaws, but their durability may be inferred from the fact that the jaws of one of these stone-breakers working in hard trap-rock lasted for five months: breaking, on an average, sixty cubic yards of stone per day, and that at the end of that time they were in good condition."

The machine has a field of usefulness before it as a crusher of rock for railroad ballast, which it has at least begun to occupy. American roads have been usually ballasted with gravel where that material is accessible; but on many Western and Southern roads, where no gravel exists, the roads have simply been left unballasted, which, as their traffic increases, is a defect which must be repaired. The Chicago, Rock Island & Pacific Company has purchased a stone-crusher to use in making ballast for its Iowa Division of limestone rock, and there are many roads, doubtless, which must sooner or later take a similar course, so that these machines are likely to have a special interest to railroad men.

Special Rules Concerning the Movement of Trains by Telegraph.

The following is from the rules printed with the time-table of the Texas & Pacific Railway:

62. The Superintendent and Train Dispatcher are the only persons authorized to move trains by special order, and but one person on the same circuit will be permitted to move trains by special order at the same time.

63. Safety demands that all persons connected with the movement of trains by telegraph, should use the utmost care and watchfulness; all rules regarding the same must be strictly observed. Orders must be made plain and explicit, and if not fully understood by those addressed, an explanation will be required before receiving them. In the transmission of orders by telegraph, no abbreviations will be used except the telegraph abbreviation "12" (answer how you understand and get my answer before starting), and "13" (I understand)—all other figures will be written in full. Example: four (4) o'clock and thirty (30) minutes. *After the reception of an order it must be strictly obeyed.* Operators are forbidden to transmit any messages in regard to the movement of trains without a genuine signature.

64. Telegraph stations will be furnished with a *green flag* and a *green lantern*, which will be used to signal trains for *telegraph orders*, and *must not be used for any other purpose.* Operators and agents must at all times have these signals in readiness to flag trains, should occasion require it. Signal must be taken in when no longer required to flag the train for which it is shown. Each agent or operator, after selecting the best location for displaying green signal (which should be conspicuous), should, as far as possible, adhere to the same locality.

65. When an agent or operator receives an order for an expected train, he must give it his strict attention, and immediately display his signal where it can be best seen by train men and watched by himself. Besides using the *green* signal, every precaution must be taken to prevent trains passing a station where ordered to be held for any purpose.

66. Engineers and conductors must carefully watch for all signals at telegraph stations, and when such signals are shown, trains must be brought to a full stop, and the conductor and engineer go at once to the telegraph office to receive and respond to such orders as may be awaiting them.

67. All orders for the movement of trains by telegraph must be communicated in writin and addressed to the conductor and engineer, to whom they will be read aloud by the operator. The conductor and engineer will sign their understanding of the order, and it will then be transmitted back to the person giving the order, who will, if the same is correctly understood, give his "O. K.," which will be indorsed on the back of the order by the operator receiving the same. No train will run upon such an order until the "O. K." is received.

68. Conductors must not sign the understandings to telegraph orders for their engineers. Engineers will sign the understandings personally. Conductors and engineers *must know* that the order given to them is an *exact copy* of the one which they sign, and will be held responsible for accepting an order which is in any particular unlike the one they have signed. This rule is not intended to excuse telegraph operators from exercising great care in making a correct copy.

69. Upon the receipt of an order, should the line cease to work before the "O. K." is received, as per Rule 68, the operator will not deliver such order, but will inform both the conductor and engineer of the occurrence, whose duty it is to adopt such precautions as will prevent accident. Trains will only proceed in such cases under protection of a flag by day or a red light by night, until all doubt is removed. Conductors must not leave a station when directed to run by special orders, without having the same in writing in their possession, properly indorsed.

70. When a train has orders to run regardless of a *specified train*, it gives the train under such orders no right over another train. All special orders for moving trains are only for the persons to whom they are directed, *and no other person shall use such orders as authority to move their trains.* When an order is sent to a train which may be carrying a flag or light for a following train or engine, in no case will the train or engine for which the flag or light is carried avail itself of any special orders which the train bearing such flags or lights may have received, without an order to that effect. When orders are duplicated to following trains, each understanding must be separately signed by the conductor and responded to by the person giving the order, as provided in rules 68 and 69. Operators, conductors and engineers must be particular to understand this rule. In such cases the *green* signal must not be taken in until all trains have passed for which the order was intended.

71. Should a train having right to the road be directed not to leave a station until a specified time, unless another train has arrived, the train so held will wait the usual *five minutes for safety before proceeding*, if the train does not arrive by the time specified.

72. Should a train be held by another between telegraph stations, the conductor of the train may require the first train passing him, bound in the same direction, to flag him to the next telegraph station against trains of the same or an inferior class, on arrival at which he must report for orders. The conductor carrying such flag shall report to the Train Dispatcher, stating from what station he flagged the train.

73. Engineers and conductors will in all cases (day and night, with regular and irregular trains,) look out for signals at telegraph stations, and any signal violently given must be regarded as a signal to stop. Absence of proper signal at stations, or on the road, must be reported by the conductor to the Train Dispatcher and Superintendent. As an additional safeguard, conductors running at night will report in person at every night telegraph office for orders. This rule is not intended to excuse the telegraph operator from showing proper signals to stop trains, or neglect in the prompt delivery of messages.

74. Conductors of all trains, immediately before starting out on their runs, will go in person to the telegraph office to inquire if any special orders are there for them, and report to Train Dispatcher the name of engineer, number of engine, and the number of cars in their train.

75. It will be the duty of all conductors and engineers, when they see telegraph lines down or broken, to report the fact to the Superintendent of Telegraph, on arriving at first telegraph station.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

Tests of Bridge Irons.

[Paper read at the annual convention in Louisville by J. Dutton Steele, C. E.]

The first test was of chord links made of Phœnixville "best best" or double refined new iron, 3in. by 1in. Section of upset eyes of the Phœnixville standard size, having a section around the eyes of 33 per cent. in excess of the section of the bar. The specifications required that it should have an elastic strength of 24,000 lbs. and a breaking strength of 50,000 lbs. per square inch, with eyes strong enough to break the body of the bar. The testing machine was a lever with weights.

First application, 20,020 lbs. per square inch; stretch in 10 feet 1-16 of an inch and recovered.

Second application, 23,600 lbs. per square inch; stretch 3-32 of an inch and recovered.

Third application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered ⅜ of an inch.

Fourth application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered ⅜ of an inch.

Fifth application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered ⅜ of an inch.

Sixth application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered 3 16 of an inch.

Seventh application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered 3-16 of an inch.

Eighth application, 50,287 lbs. per square inch; stretch ⅜ of an inch and recovered 3-16 of an inch.

Ninth application, 50,287 lbs. per square inch; broke in the eye, after a permanent stretch of 12 inches in 24 feet, and in the eye of 3-16 of an inch.

The next test was of round truss rods from M. B. Stotesenburg & Co.'s works, Wilmington, Del., 1¼ inches in diameter, of Pencoyd iron, made of selected scraps of the best quality, with an eye at one end, and a screw at the other. The specifications as to strength were the same as in the former case.

The eyes were made by turning the ends of the rods round the eyes and welding them to the body of the bar, and the screw ends were either upset or split, and a wedge-shaped piece welded in them, and swedged into shape so as to produce an enlargement that would enable the nuts to pass over the body of the rods, and the nuts had a depth equal to the diameter of the upset ends of the rods. The testing machine was a

hydraulic press, supplied by a force-pump with a one-inch plunger.

First application, 20,000 lbs. per square inch; stretch ¼ of an inch in 14 feet—recovered.

Second application, 24,000 lbs. per square inch; stretch 3-16 of an inch in 14 feet—recovered.

Third application, 26,000 lbs. per square inch; stretch ¼ of an inch in 13 feet—recovered *nearly*.

Fourth application, 50,000 lbs. per square inch; stretch 7 inches in 14 feet—recovered ¼ of an inch.

Fifth application, 55,000 lbs. per square inch; stretch 9 inches in 14 feet—recovered ¼ of an inch.

Sixth application, 52,000 lbs. per square inch; stretch 11 inches in 15 feet—recovered ¼ of an inch.

Seventh application 50,000 broke in the body of the bar, near the eye, after a permanent stretch of 3½ feet in a length of 24 feet. The peculiarity in this last application was that the bar stretched under a pressure of 50,000 pounds as fast as the force-pump could supply the power necessary to move the piston of the press with a pressure gradually running down below 50,000 pounds, until it broke; neither the eye nor the screw received any injury from the tests to which the bar had been subjected. The important difference indicated by these tests on the two descriptions of iron, the one new and the other made from scrap, and both of the best quality of their kind, is that the elasticity of the former increased as it became gradually weakened by successive strains, whilst in the latter it decreased, although there was a greater capability of stretching before it finally gave way. They also indicate how emphatically it is the elastic strength and not the breaking strength that should govern the use of iron in bridges, as each successive strain beyond that limit must weaken the bars and ultimately produce failure. It may also be doubted if, where the upsetting process is used, a process which, in accuracy and uniformity, is superior to all others for making eyes, there should not be a greater section round the eyes to compensate for the derangement of the fibers produced by the operation.

Mr. McALPINE—Will you allow me to ask a question? How long was the test applied?

Mr. STEELE—No very considerable time—ten or fifteen minutes.

The CHAIR—Discussion on the paper read is now in order.

Mr. COLLINGWOOD—I would like to inquire in what sense the term elasticity is used.

Mr. STEELE—I use the term elasticity as connected with the power of the iron to recover itself from any strain which it may be subjected to. That power the scrap iron seemed to have to a greater degree than the new iron, but the proportion of recovery was greater in the new iron, when subjected to this strain, than it was in the iron made from scrap.

Mr. COLLINGWOOD—The limit of elasticity certainly did not increase; that limit beyond which there was a permanent set did not increase.

Mr. STEELE—No; the power of recovery.

Mr. SMITH—I would like to ask what was the diameter in each case.

Mr. STEELE—Three inches in diameter.

Mr. SMITH—Did you examine the fracture with a microscope to see whether there was any sign of upturned fibres?

Mr. STEELE—I did not examine it sufficiently to indicate that. The iron was perfectly sound. It seemed just to break where the leverage obtained the greatest power. There cannot be a doubt, however, but that there is a disarrangement of the fibres from the upsetting process.

Mr. CORYELL—I made the same experiment and the result was precisely the same, except in regard to the stretch of the iron. It always commenced in the middle and ran out. We tried new iron from different manufactories, and the results were precisely the same as stated by Mr. Steele. The elongation and elasticity were the same up to a certain point. I could not give you the figures, however, without reference to notes.

Mr. STEELE—I am requested to explain that the fracture was on a direct line across the diameter of the eye.

Mr. McDONALD—I think, Mr. President, that this is but another evidence of the vast importance of a proper pin connection. The diameter of the pin in this particular case seems to have been large enough; but any one who examined that eye-bar, having frequently 33 per cent. more material in the eye than in the bar, must be struck with the idea that it is a very difficult matter to transfer the strain. The practice in Phœnixville is to put at least 50 per cent. more material across the eye than in the body of the bar. By a number of experiments made in England, extending from 1862 to 1869, it was found by changing the shape of the eye, putting more material behind the pin, that twenty-five per cent. material gave a better result. It depends entirely upon the way in which the strain is transferred from the bar itself. In upsetting, it is a very difficult matter to graduate the material down so as to make this curvature easy and gradual from the bar itself to the bearing point of the pin. I should suppose that the best iron made at Phœnixville would stand more than 52,000 pounds. The breaking of this eye showed that the strength of the iron was not developed, and unless we have a pin connection we cannot get the strength.

Mr. BOLLER—I have nothing to add beyond what has been stated by the gentlemen who have discussed the question. We know that the transfer of the strength should be made as gradual as possible across the bearing point of the pin. Our practice is to make the radius of the connecting curve about double the diameter of the hub. I would like Mr. Steele to have enlarged his experiments so as to have taken a piece of the material from the body of the bar itself, and also a piece of material from the hub, and see if there was any damage caused by the process of manufacture.

Mr. CLARK—I think the illustration stated is perhaps as good an illustration as this convention could possibly have of the necessity which exists for a series of experiments, which should be taken by somebody who would look at this matter from a purely scientific point of view. Each member can only tell a few experiments that he has tried himself. There should be a series of experiments to show the strength and elasticity and other properties of American irons, the proper proportions, and the proper mode of manufacture. I hope that it can be done.

Mr. WOOD—There is one point that has not been touched upon, to which I wish to call attention. It is known that a slight strain apparently produces a set in iron. It may be exceedingly small, and reasoning upon such data, it may be affirmed that no iron structure is safe because the set will increase. That is the point I wish to notice.

You apply a strain to iron—say ten thousand pounds—and after five, ten or twenty hours you observe that there is a permanent set. I will not raise the question whether that will disappear in five years. Now, if you apply ten thousand pounds again, noting the elongation, does all that elongation return to the bar? So far as I have observed, it becomes rather indeterminable after applying five or ten static strains. It has been a question in my mind whether, if we do not exceed a certain amount of strain, after the iron has been submitted to a strain, whether it would not be wholly regained.

Mr. SMITH—I am able to answer the question partially. I have made experiments, testing up to 27,000 pounds. I have again subsequently tested the same piece of iron and obtained the same elastic point in the bar. An experiment was made by Mr. Albert Fink, of this city, on a bridge built by him on the Baltimore & Ohio Railroad, where a bar of iron was so placed as to be subjected to a strain of seventeen or eighteen thousand pounds. This bar was brought to Louisville in 1858, after having been four years on this bridge, where it was exposed to the extremes of temperature and these severe strains. It was brought to Louisville and tested here, the bar being cut in two, in connection with a similar bar of the same grade of iron which had not been in use. The bar which had been in use broke at nearly the same strain as the other—61,000 pounds. 61,500 was the limit of the bar which had not been in service.

The CHAIR—How many applications of the load?

Mr. SMITH—The application of the load to the new bar was made gradual. We were putting it on and casting it off to determine the point of elasticity.

The CHAIR—What about the old bar?

Mr. SMITH—The old bar was twice tested. We cut it in two and tested the two pieces. They broke at very nearly the same point.

The CHAIR—Was that charcoal or anthracite iron?

Mr. SMITH—That I cannot say.

The CHAIR—The Society have heard the paper and the discussion. It seems to be determined upon approximately in the new bars experimented upon by Mr. Steele, that the limit of elasticity of the new iron was superior to the scrap iron—the limit being about 24,000 pounds; that in the case of the bar made out of the scrap, the elastic limit was much less clearly defined. As to what time the elastic limit of a bar would commence being impaired, the experiments related by Mr. Smith are very interesting. How long was the bar in use?

Mr. SMITH—Over four years.

The CHAIR—The bar being in use four years was found to have an elastic limit of about 24,000 pounds to the square inch. With reference to the eyes, the experiments as developed by the gentlemen seem to be that the cross-section opposite the pin ought to be from 25 to 33 per cent. greater than the body of the pin. With reference to the suggestions made by Mr. Clark and Mr. Wood, as to the want of extended experiments upon the strength of wrought iron, I would say that it is very desirable that more extended experiments should be made. The Chairman therefore recommends to the special attention of the members of this Convention the subject of the necessity of careful experiments at an early day on the strength and elasticity of wrought iron.

MASTER CAR BUILDERS' ASSOCIATION.

Seventh Annual Convention.

The time and place for holding this meeting, as has been announced for several weeks past in the GAZETTE, was in Boston, June 11, 12 and 13. On Tuesday, June 10, a large delegation of members of the Association and others left the Grand Union Depot in the 10 a. m. train for Boston. They were the guests of a committee consisting of their friends in New York, who escorted them, and who supplied an elegant dinner at Springfield for the whole party. The following report is made up chiefly from the Boston papers, with revisions:

FIRST DAY'S PROCEEDINGS.

The convention met in Meionaon Hall, in Boston, at ten o'clock on Wednesday morning, June 11, as announced. In the absence of the President, the meeting was called to order by the Vice-President, Mr. M. P. Ford, of the Little Miami Division of the Pittsburgh, Cincinnati & St. Louis Railway, who stated that Mayor Pierce was present and would address the meeting. Mayor Pierce was then introduced, and spoke as follows:

ADDRESS BY MAYOR PIERCE.

"*Mr. President and Gentlemen of the Master Car Builders' Association:* I am very happy, on behalf of the citizens of Boston, to welcome you to our city at the present time. You are here, as I understand, from every State in the Union where your Association extends, to impart information, one to the other, to compare experiences, improve the railway carriages for passenger travel and for the transportation of freight in the country. Nothing can be more worthy of such an assemblage than that for which you have assembled; it touches the happiness and prosperity of the people of the country. When I look back and see the improvement which has been made since those originally constructed, I cannot doubt that a great share of it has been caused by the free consultation of men engaged in the construction of those carriages, on occasions like this.

"We know, gentlemen, that great improvements have been carried forward by such assemblages as this, and I cannot doubt that this convention will carry to a still higher state of perfection and convenience the railway carriages of the country. I trust you will have a pleasant visit among us, and that your stay in our city will be of great benefit and improvement to yourselves and to all of us. Knowing that you do not wish to be detained, I again bid you a cordial welcome."

Mr. Ford responded briefly to the Mayor's address, and thanked him in behalf of the Association for the welcome extended to its members.

The roll of members was then called, and 57 persons responded to the call, after which prayer was offered by Rev. Mr. Foote.

The convention then proceeded to the choice of a Vice-President *pro tem.*, and Mr. V. D. Perry, of the Hartford, Providence & Fishkill Railroad, was unanimously chosen to fill that position.

Mr. Ford then addressed the meeting as follows:

PRESIDENT'S ADDRESS.

"*Gentlemen of the Master Car Builders' Association:*

"On this, the 11th day of June, you are again in session pursuant to adjournment. I very much regret that owing to absence of our President, it devolves upon me to perform the duties of his office. Fully sensible of my inability to say anything which will be of interest or profit, still in compliance with the requirements of our constitution I must at least appear before you.

"Allow me, upon this seventh annual meeting of our Association, to congratulate you upon the increased number of members present at this our opening meeting. May we not look upon this as a sure guarantee of its steady growth and of its increasing value to us as a help in acquiring the information which will enable us not only to most effectively and economically perform our duties to our several corporations, but to serve the traveling public by adding to their comfort and safety. To enable us to thus perform our work, and to help us in keeping pace with the improvements constantly being made in this age of progress, was the great object for which our Association was formed; and how can we better carry this out than by meeting once a year in convention, and by free discussion and interchange of thought gain that knowledge which single-handed and alone we could not acquire.

"There probably never was a time when there was a more imperative necessity for persons occupying important positions in any of the mechanical branches to keep their eyes and ears open, and to improve all the means within their reach to keep themselves informed of the improvements and changes which are going on around them. And especially is this true of us. Most of us can recall the time when the cars belonging to the roads with which we have been connected seldom went beyond our own lines. Now we find them running the length and breadth of the land, and made of almost every conceivable pattern. We are aware that railroad officials are divided with reference to the value of such assemblages. Some are free to assert that the main object is to enable the members to have a good time; others may expect more of us than we shall be able to perform. I believe we shall be able to demonstrate—or rather I believe we have already demonstrated—that we are laboring by means of our Association to become the better fitted for the trust confided to us.

"There are many questions of great importance in connection with the construction and maintenance of the vast rolling stock of our railroads which are constantly coming up, and which our experiences from year to year should help us to solve. The committees appointed at your last meeting to report upon the various questions submitted to them, I trust are here prepared to report. Let us have a full and free discussion of them.

"I would recommend that the committee to report upon business to be brought before our next meeting be appointed early in the session, in order that the committees to be appointed to report upon the various questions may be fully decided upon before adjournment.

"There are several important subjects to come before us. We hold but one session each day, and this with the amount of other business that must be acted upon will make it manifest that only by close attention to business and earnest work can we accomplish the work before us.

"Thanking you for your kind attention to these remarks, and soliciting your support in the performance of my duties, I now commit this convention to you."

COMMITTEE REPORTS.

The following committees were then appointed by the Chair:

On Communications—F. A. Adams, Boston & Albany Railroad; J. T. Leighton, New Haven Car Company; C. A. Smith, Erie Railway.

On Business for Next Meeting—J. W. Van Houten, Pennsylvania Railroad; W. H. Dunham, Pittsburgh, Fort Wayne & Chicago; V. D. Perry, Hartford, Providence & Fishkill.

The report of the Treasurer, Mr. Aaron Steinbach, was then submitted. It showed that the receipts have been $697.81, the payments $179.65, and the balance on hand $518.18.

Mr. M. N. Forney, one of the editors of the RAILROAD GAZETTE, from the committee to prepare a dictionary of terms pertaining to the business, reported progress, and it was moved that the Association assume the expense of publication, and each member subscribe for a certain number of copies. The expense is to be about a thousand dollars. Considerable discussion ensued, and the motion was lost, but the same motion without the provision for the assessment of members was passed unanimously. Another discussion ensued, and it was voted to appropriate $800 for the use of the committee.

Mr. V. D. Perry, from the committee to investigate the various methods of ventilation of cars, reported the results of a number of interesting experiments instituted by the committee. The report was accepted.

Committees were appointed on assessments, and to nominate a list of officers for the ensuing year.

A communication was received from James T. Furber, Superintendent of the Boston & Maine Railroad, inviting the members of the Association to an exhibition of the operation of the Vacuum and Westinghouse brakes, which was accepted, and the meeting adjourned to witness the trial.

TRIAL OF THE WESTINGHOUSE AND VACUUM BRAKES.

The trial took place on the fourteen miles of double track between Reading and Lawrence. The Boston & Maine Railroad Company is now using both these brakes on its cars, but has adopted neither, and this competitive exhibition was desired by Superintendent Furber before a permanent application is made. The company witnessing the trial consisted of about two hundred gentlemen, including the superintendents of the Boston & Lowell, Boston & Providence, Fitchburg, Boston & Albany, Old Colony and Eastern railroads; E. M. Reed, of the New York, New Haven & Hartford; R. Stewart, of the Cheshire; Daniel L. Harris and J. Mulligan, of the Connecticut River; R. E. Ricker, of the Central of New Jersey; John Hawkins, of the Grand Trunk; C. A. Faxon, of the Fitchburg and Cheshire; James Lyons, of the Boston, Concord & Montreal; Mr. Foss, of the Central Vermont; W. F. Knowles, of the Chicago, Rock Island & Pacific, and a large number of the delegates to the Master Car-Builders' Association. The tests were made under the special direction and observation of a committee selected by the two brake companies and by Superintendent Furber. The invitations to be present at these experiments read as follows:

"BOSTON & MAINE RAILROAD,
"GENERAL SUPERINTENDENT'S OFFICE,
"BOSTON, June 7, 1874.

"Having for several months been using both the Vacuum and the Westinghouse brakes on this road, and being anxious to witness a trial of these brakes when run on parallel tracks, and under like circumstances, I propose making such trial on Wednesday, June 11, 1873, over 14 miles of track between Reading and Lawrence.

"If either the Westinghouse or Vacuum brake companies are dissatisfied with the condition of their brakes at the time of trial, I shall be pleased to have them put their brakes in order, and I will then give them another trial.

"You are respectfully invited to be present and witness the experiments, which will take place on Wednesday, June 11, 1873. The train will leave Boston & Maine Railroad station, Haymarket square, at 11:35 p. m.

"JAMES T. FURBER,
"General Superintendent."

The manner in which the tests are conducted, and the results are fully shown by the following report by the committee:

"BOSTON, June 11, 1873.

"The committee appointed to take charge of a series of experiments upon the Boston & Maine Railroad, to test the relative merits of the Westinghouse brake and the Vacuum brake, beg leave to submit the following report:

"For the first three experiments twelve cars were used in each train, which were furnished by the Boston & Maine Railroad, run side by side, with results as follows: Trains run at speed of 26 miles per hour; signals for stops, explosion of torpedoes on each track; Westinghouse train stopped short of Vacuum train 25 feet.

"*Second and third trials*—Speed 32 1-10 miles per hour; 26 and 31 seconds in stopping respectively. Distance: For second trial, Westinghouse stopped in 825 feet and Vacuum in 800 feet. Third trial, Westinghouse 992 feet and Vacuum 967 feet.

"*Fourth trial*, with nine cars on each train. The Westinghouse train consisted of cars furnished by the Eastern Railroad, and they were equipped with the automatic attachment. Results as follows: Trial No. 4, vacuum train stopped in 22½ seconds; Westinghouse train stopped in 15½ seconds, and 315 feet less distance than the vacuum train.

"*Fifth trial*—Vacuum train stopped in 26 seconds; Westinghouse train stopped in 20 seconds, and 265 feet less distance than the vacuum train.

"*Sixth trial*—Consisted of disconnecting locomotive from train at speed, and the train was successfully stopped by the Westinghouse automatic brake. Time and distance not taken.

"*Seventh trial*—Consisted of breaking train in two parts, or disconnecting three cars from the rear. Stop was made by the automatic brake successfully.

"*Eighth and ninth trial*—Were to see which train could stop and start the quickest. In the eighth trial the advantage was slightly in favor of the Westinghouse brake. In the ninth trial the vacuum brake had a decided advantage.

"On the return trip a series of experiments were made, consisting of station stops; the vacuum train following the Westinghouse from Lawrence to Boston. The Westinghouse train

made the following stops without using the automatic attachment: The first stop was made at Andover, and 2 minutes and 26 seconds elapsed between the stopping and starting of the train. The reason of this long stop was that an outward-bound train was standing at the station. At Ballardvale 6 seconds were used; at Wilmington, 4; at Reading, 4½; at Wakefield, 7; at Melrose, 5; and at Malden the train did not stop. The vacuum train made the following stops: At Andover, 23½ seconds; at Ballardvale, 19; at Wilmington, 19; at Reading, 12; at Wakefield, 91; at Melrose, 11; at Malden, 8.

"The locomotive of this train was short of steam, it being so low she started the train with difficulty at nearly every station.

(Signed)

"J. Mulligan, Chairman; F. M. Adams, A. B. Underhill, J. W. Philbrick, A. A. Folsom, E. R. Reed, I. R. Kendrick, R. S. Ramsey, P. N. Lander, Committee."

These experiments were watched with a great deal of interest by all present, and were at times somewhat exciting. It was certainly quite novel to be a passenger on one of two trains running side by side as evenly as a pair of matched horses, and at a speed of upward of thirty miles an hour, and it is not often that one has the opportunity of stepping from one train to another, going at such rate, with as much ease, although at greater risk, as he would cross a narrow brook. And when the brakes were put on it seemed almost like a personal application and half took away one's breath to lose momemtum so quickly. The friends of both inventions express themselves satisfied with the results. The Westinghouse people, however, although their brake generally did better execution than the other, would have been better pleased to have had a longer time than twenty-four hours in which to prepare for the competition; but they were fortunate in obtaining from the Eastern Railroad cars to which were applied their brake with its automatic attachments and all its latest improvements. For the Vacuum brake it was claimed that the experiments demonstrated that the invention is capable of better things than it or any other brake has yet accomplished, and in showing this the results are looked upon with satisfaction. At the South Lawrence station a collation was served the party by Mr. Smith, representing the Vacuum Brake Company.

On the return trip a meeting was called on the train by Superintendent Winslow, of the Boston & Lowell Railroad. It was organized by appointing Hon. A. D. Briggs, of Springfield, Chairman, and M. N. Forney, of New York, Secretary. On motion of N. C. Baker, of New York, it was resolved that the thanks of the members of the Master Car Builders' Association and others invited to witness the experiment be extended to the Boston & Maine Railroad Company, and to Mr. Furber, its Superintendent, and other officers of that road, for affording so excellent an opportunity of seeing the practical working of the two systems of train brakes. On motion of Ivers Phillips, of Worcester, a similar vote of thanks to the Eastern and to the Boston & Lowell railroad companies and to the officers of these roads was passed, and the Secretary was instructed to send a copy of these resolutions to the officers named, and to have them published in the daily papers.

In the evening the members of the Association attended the Boston Theatre.

SECOND DAY'S PROCEEDINGS.

WARMING AND VENTILATING CARS.

The report of the committee upon the subject of warming and ventilating cars was taken up and discussed. The first section of the report contained the inquiry of how many cubic feet of air should be supplied to each passenger in order to keep the atmosphere in the car pure, and the second section as to the best means of admitting and exhausting air from cars in cold weather. Mr. M. N. Forney, of the RAILROAD GAZETTE, was the first speaker. He dwelt upon the importance of pure air, the quantity of which required by each passenger in summer had been stated at ten cubic feet per minute, and four cubic feet in winter. He did not indorse this estimate, however, inasmuch as the atmosphere in cars would become as vitiated in winter as in summer. One of the most prolific sources of discomfort in traveling was the foulness of the air, and he hoped the car-builders would give the matter a full and careful consideration. F. D. Adams, of the Boston & Albany, explained the method of ventilating cars on his road, which is one of the most effective in use. A. Steinbach, of the Philadelphia & Reading road, said that the cars on that line were heated by furnaces with double casing attached to the bottom and outside of the cars, with registers under each seat. The damage from fire was greatly lessened by this method. Mr. E. Davenport, of the Erie car works, said that there was no difficulty in ventilating cars in winter, but he could not conceive of any plan for admitting air in summer free from dust and cinders. Mr. Adams entered more fully into a description of the method of ventilating his cars, and spoke of the difficulty of inducing brakemen to regulate the apparatus. The application of the Westinghouse brake was thought to give the brakemen more time, but they did less work now than before. Mr. Garey, of the New York & Harlem Railroad, said that the cars on his road admitted air through an aperture in the end over the door, which method had proved effective. The question was further discussed by Robert Hitchcock, of the Connecticut River road; V. D. Perry, of the Boston, Providence & Fishkill; H. D. Wadlie, of the Illinois Central. The latter said he used the "Spear system" of ventilation, substantially the same as that described by Mr. Adams. J. W. Van Houten, of Pennsylvania, moved that the further consideration of the subject be postponed for twelve months, and that the committee send out circulars asking for reports of experiments. The motion was carried.

MISCELLANEOUS.

The President announced as the Committee on Resolutions M. N. Forney, L. H. Cummings and J. W. Van Houten, and the Committee to present a place for next meeting, David Hoit, H. O. Wadlie and Hugh Gray. Mr. Adams said he was glad to see several gentlemen present from Virginia, as they had expressed a desire to have the Association meet in the South next year, and he hoped the committee would consider their wishes. The Committee on Communications reported that an invitation had been received from the merchants and others of Boston, who met at the American House, to an excursion in the harbor and a ride in the suburbs, which was accepted. Communications were also received from the Superintendents of the Boston railroads, extending courtesies to the Association, and from New York merchants and manufacturers inviting the members of the Association to a drive at Newport on their way to the South and West. The Committee on Assessments reported in favor of assessing each member $5 to pay the expenses of the ensuing year, which was adopted.

CAR AXLES, BOXES AND BEARINGS.

The Committee on Axles, Boxes and Bearings submitted a report recommending a larger axle, a longer and larger journal and a larger oil box, as of great advantage in distributing friction and avoiding delays by hot boxes. The report was accepted and formed the subject of a protracted discussion. Messrs. Adams and Van Houten differed upon the matter of sizes of journals. A motion was made to adopt the sizes recommended by the Committee, which led to further discussion. Mr. Garey said that the recommendation of any special plan seemed to inspire a fear that by adopting it the members would commit themselves to its use upon the railroads with which they are connected. This view of the case was erroneous. If the best minds in the Association had considered and decided upon the proper sizes and lengths, it was no more than right that the Association should put on record its recognition of the merits of the plan.

Upon motion of J. W. Philbrick, of the Maine Central, it was voted that a committee, appointed by the Master Mechanics' Association, and which was present, should be invited to give the result of their investigation.

M. N. Forney, Chairman of that committee, then read portions of a report, which lead to a warm discussion, in which Messrs. Van Houten and Forney participated. The further consideration of the subject was then postponed till ten o'clock this morning.

The Committee on Car-roofs was then called upon for a second time to report, and the Chairman responded that they were not prepared to report.

An ineffectual effort was made to adjourn.

Mr. Garey, the Secretary, submitted a long report of the Standing Committee on Check-chains, which was recommitted to the committee, Mr. Wadlie, of the Illinois Central, being substituted for C. C. Miller, of the Georgia Central Railroad, as a member of the committee. A resolution was adopted that no patent or supply agent shall be allowed to display or discuss his wares during the regular sessions of the Association. The Convention then adjourned until nine o'clock this morning.

EXCURSION IN BOSTON HARBOR.

At half-past two o'clock the Association embarked on board the steamer Meta for an excursion in the harbor. The committee of merchants and others to whom was assigned the duty of perfecting all arrangements for the trip consisted of the following-named gentlemen: J. A. Pingree, Silas M. Munson and Charles S. Knowles. The company consisted of about four hundred ladies and gentlemen, and shortly before three o'clock the steamer left India wharf and sailed down the harbor, skirting Spectacle, Half Moon and Apple Islands, the Metropolitan Band, which was on board, discoursing excellent music, which greatly added to the pleasure of the occasion.

Passing around Forts Winthrop and Independence, and then steaming on until Nix's Mate was reached, Captain Dale repeated the history of that historical monument to his guests, after which the voyage was continued beyond the inner harbor and along the north shore, passing Nahant, Lynn and Revere Beach. The course of the Meta was altered for Minot's Ledge lighthouse, and after a short but pleasant sail that solid structure was reached, and viewed with much interest by the visitors. An excellent clam chowder was then served, and was highly relished by appetites which had become well sharpened by the invigorating sea breeze. After an hour had been spent in cruising off the ledge, the boat was headed for home, and a most delightful sail was enjoyed up the harbor, Captain Dale kindly shaping his course in order that all points of interest might be viewed by his guests. Lynn, Swampscott and Nahant were again passed, and just as Egg Rock was rounded the company were interrupted in their sight-seeing by the steward's summons to the saloon, where a fine collation was in waiting, and to which, without formalities, all were invited and did ample justice. At the conclusion of the collation a run was made around interesting points in the inner harbor, and soon after 8 o'clock the gallant Meta steamed up to her berth at India wharf, where carriages were in waiting for the guests.

THIRD DAY'S PROCEEDINGS.

Mr. Garey, the Secretary, called attention to the new rooms in New York for the meetings of the members in that city. The rooms were opened in December last, and in them were placed the models of new inventions and improvements in cars. The rooms were made self-supporting by means of advertising railroad supplies. Since opening the rooms have been visited by 317 persons, in which number were included superintendents of railroads and others. Mr. Adams, of the Boston & Albany Railroad, moved that the Association assume the control of the rooms of the Association in New York city, and place them under the control of the Managing Committee appointed by the officers of the Association, with power to call meetings for discussion not oftener than once in each month, and that C. A. Smith and M. N. Forney be added to the Committee. The motion was carried. Mr. Garey offered the following, which was adopted by a unanimous vote:

"*Whereas*, it is thought that an impression prevails among the managers of some railroads that the action of this Association is intended to be enforced by its members without the advice and consent of their superior officers; therefore be it

"*Resolved*, That it is the sense of this meeting that the resolutions of the master car-builders in convention assembled are intended merely as recommendations as an association to the managers of railroads for their adoption or rejection as they may think best."

M. N. Forney, of the RAILROAD GAZETTE, suggested that a committee should be appointed to investigate the cause of the many accidents resulting from coupling cars. The recurrence of these accidents was as frequent as it was painful, and it was a subject well worth investigating with a view to lessen the number of accidents. In eight months he had collected 234 paragraphs from the papers referring to accidents of this nature, and this was probably not one-tenth of the number of accidents which have occurred in the country in the time given. Mr. Davis, of the Boston, Lowell & Nashua Railroad, moved that a committee should be appointed to consider and report on this matter at the next convention. The motion prevailed and the Chair stated that a committee would be appointed.

THE SIZE OF AXLE JOURNALS.

The special assignment, viz., the discussion of the size of axles, was then taken up and considered. Mr. Adams, Chairman of the Committee on Axles and Oil Boxes, which was authorized to confer with the Committee of the Master Mechanics' Association on the same subject, reported that they met the Chairman of the Master Mechanics' Committee, and that they jointly concluded that if obliged to recommend a size of journal for car axles, they would at the present time not feel authorized to propose one larger than 3½ inches in diameter and seven inches in length, but in consideration of the great importance of the subject, the diversity of opinion, and to some extent the limited knowledge existing in regard to it, they recommended that it should be referred back to the committee with instructions to confer with the Committee of the Master Mechanics' Association and report specific sizes for a standard axle, with a detailed drawing showing clearly its form and proportions, at the next annual convention. It was also recommended that the subject should be freely discussed at the present session. The report was accepted.

After considerable discussion as to whether the subject should then be discussed or postponed, it was decided that, inasmuch as the convention had accepted the report, debate on it was in order. Mr. Garey said that the subject was a very important one, and he hoped that it would not be postponed another year. One hundred thousand cars had been built during the past year in the United States, and it was time that the Association should adopt some standard and uniform size. The matter should be thoroughly discussed, and, if possible, a decision reached at this session.

The subject was then discussed by Messrs. Varney, of the Fitchburg Railroad; Longest, of Richmond, Va.; Stewart, of Hartford, Conn.; Hitchcock, of the Connecticut River Railroad; Garey, of the New York & Harlem; Adams, of the Boston & Albany; Wadlie, of the Illinois Central, and others. Upon motion of Mr. Somerby, of the Eastern Railroad, the roll was called, and each member was allowed briefly to express his opinions on the size and length of the journal. The result of the vote was as follows: Mr. Childs was in favor of an increase, but was not in favor of four inches in diameter. C. A. Smith, of the Erie Railway, said that upon that road the 3½ by 7 size had been abandoned and the 3¼ by 6 had been substituted. This had met with much better success. The road was a hard one and had the broad gauge, which in the opinion of many was much harder than the narrow gauge. By the use of this plan the road was not in the least troubled with hot boxes, and the cars were run miles over the roughest portions of the road without generating heat in the boxes. Mr. Wadlie, of the Illinois Central, was in favor of 3¼x7; J. Jones, of the New York Central & Hudson River Railroad, favored 3½x7; E. Varney, of the Fitchburg Railroad, favored 3½x6½; R. Dean, of the Taunton Car Works, 3½x7; V. D. Perry, of the Hartford, Providence & Fishkill, 3½x7; G. R. Bentley, Norwich & Worcester, 3½x7; F. D. Adams, Boston & Albany, 3½x7; A. Steinbach, Philadelphia & Reading, 3½x8; J. W. Van Houten, Pennsylvania, 3½x7; D. H. Baker, Pennsylvania, New Jersey Division, 3½x7; Hugh Gray, Chicago & Northwestern, 3½x7; G. W. Demarest, Northern Central, 3½x7; D. S. Dockstader, Atlantic & Great Western, 3½x7; C. Woods, Union Railroad & Transportation Company, 3½x7; A. Langley, Northern New Hampshire, 3½x7; James McGee, Pittsburgh, Cincinnati & St. Louis, 3½x7; D. Hoit, Toledo, Wabash & Western, 3½x7; R. Hitchcock, Connecticut River Railroad, 3½x7; G. Hackett, Central of New Jersey, 3½x7; G. Dunham, Union Railroad & Transportation Company, 3½x7; C. A. Smith, Erie Railway, 4x7; M. P. Ford, Pittsburgh, Cincinnati & St. Louis, 3½x7; M. C. Andrews, New York & New Haven, 3½x7; A. Gleason, Old Colony Railroad, 3½x7; H. Longest, Richmond, Danville & Piedmont, 3½x7; H. E. Chamberlain, Boston & Albany (Worcester Division), 3½x7; J. P. Leighton, New Haven Car Company, 3½x6; G. E. Stevens, Union Pacific, 3½x7; J. J. Nalls, Orange, Alexandria & Manassas, 3½x7; S. Campbell, Wilmington, Delaware, 3½x7; W. A. Morgan, Atlantic, Mississippi & Ohio, 3½x6½; J. N. King, Chesapeake & Ohio, 3½x6; S. Griffiths, Indianapolis, Cincinnati & Lafayette, 4x7; P. G. Davis, Boston & Lowell, 3½x6½; M. N. Forney, RAILROAD GAZETTE, 4x8; C. J. Holbach, Catasauqua & Fogelsville, 4x6½; L. Garey, New York & Harlem, 3½x7; R. B. Moore, Indianapolis & St. Louis, 4x7; M. Wilder, Erie, 3½x7; J. Lightner, Boston & Providence, 3½x6; W. H. H. Price, St. Louis & Southeastern, 4x7; W. R. Davenport, Erie Car Works, 3½x7; A. C. Robson, Lake Shore & Michigan Southern, 3½x7; F. O. Bray, same road, 3½x7; A. J. Allen, Indianapolis, Bloomington & Western, 3½x6; J. Hay, Mobile & Ohio, 3½x7; A. H. Dennett, Eastern Railroad, 3½x7; W. T. Worth, Philadelphia, Wilmington & Baltimore, 3½x7; J. D. Mellvain, Lake Shore & Tuscarawas Valley, 3½x7; L. H. Cummings, of the Cummings Car Works, Jersey City, N. J., 3½x7; J. W. Philbrick, Maine Central, 3½x7; D. H. Stratton, Tioga Railroad, 3½x7; S. A. Davis, Boston & Lowell, 4x7; C. E. Garey, New York & Harlem, 4x7, and a seven-foot axle; J. B. Weston, Boston & Albany, 3½x7; E. Richardson, Boston & Maine, 3½x7; B. J. Mitchell, Grand Trunk, 3½x7.

The following is a summary of the report: 7x3⅜—30; 7x3½—28; 7x4—7; 6½x3½—3; 8x3½—1; 6x3½—1; 6x3¼—1; 8x4—1; 6½x3⅜—1. A proposition was then made to make the standard seven inches long by four in diameter, and it was defeated by a rising vote. A roll-call was had on the proposal to make the standard 7x3½, and resulted in thirty in favor to thirty-eight opposed to that standard. A motion to make the standard 3½x7 was then put and carried, and the size of journal was accordingly fixed. The Association then voted that six feet ten inches between the buttons or collars be the standard length of the axle. The Association then adjourned till 8 o'clock.

EXCURSION IN THE SUBURBS.

In the afternoon the Association enjoyed a ride in the suburbs. The party, which included ladies, and numbering about 200, left the American House in carriages about 3 o'clock. A large number of the carriages drove to the Navy Yard and around Bunker Hill Monument, others visited Cambridge and Mount Auburn, Brighton, Watertown Arsenal, Chestnut Hill Reservoir; thence passing through the beautiful drives in Brookline, the party drove through Longwood and returned home, passing through Tremont, Arlington, Boylston, Beacon and other principal streets to the American House, which was reached shortly after 7 o'clock.

EVENING SESSION.

The Convention reassembled at 8 o'clock in the evening, Vice-President Ford in the chair. The committee to whom was referred the matter of selecting a place to hold the next annual meeting reported that they had chosen the city of Cincinnati, O., as the place to hold the next annual convention of the Master Car-Builders' Association. After some discussion on the report, the recommendation of the committee was adopted. Mr. Adams called the attention of the convention to the fact that the subject of a uniform standard for an oil box for axles was yet unsettled. Mr. Forney thought that as the matter of axles and journal boxes was an extremely complicated affair, it should be referred to the committee to report at the next annual meeting. A committee of five were appointed with full power to prepare a model for an oil box to be exhibited at the next annual meeting as the standard oil box. The Committee on Car Roofs not being ready to report, a new committee was appointed with instructions to report at the next meeting. The Committee on Brakes submitted their report, which was read by Mr. Forney. The committee reported the experience of the members of the Association regarding the construction of train-brakes. A great amount of practical information was submitted in tabular form. With reference to the safety train-brakes, the committee report as follows: "We find that of those who have returned answers in the matter of safety brakes, the majority replied that they have not used them. We have reports from seven members who use the Westinghouse air brake, and with one exception report in its favor as a safety brake. Three use the Creamer patent brake, and report very good results from their experience, and that it can be applied from any part of the train or engine. Those who report on the Creamer patent brake consider it reliable in all temperatures, but that it is not under the entire control of the engineer." The report embraces the official statement of the trial of the Westinghouse and Smith vacuum brakes, which took place on the Boston & Maine Railroad Wednesday. The report concludes by favoring the adoption of the Westinghouse atmospheric brake. After some debate it was voted that the Committee on Brakes be continued for one year, for the purpose of further investigating the matter. The following committees were then appointed: Committee on Oil Boxes and Journals, C. A. Smith, J. W. Van Houten, Joseph Jones, David Hoit and F. D. Adams. Committee on Arrangements for the next Annual Meeting, W. H. Allison, David Hoit. Committee to Arrange for the Exhibition of Materials and Machinery for the Construction and Repair of Cars, W. H. Allison, David Hoit.

The Committee on Resolutions recommended that votes of thanks be given to the Mayor and citizens of Boston for the admirable manner in which they had prepared for the deliberations of the Association and the comforts of the members during their stay in this city; to the Westinghouse Atmospheric Brake and the Smith Vacuum Brake companies; to the Boston & Maine, the Boston & Lowell and the Eastern Railroad corporations and their officers, for the pleasant and profitable excursion and the experiments provided for the car-builders and their associates; to Mr. George Armstrong, proprietor of the Boston & Albany Railroad Express, for furnishing transportation for the baggage of the members; to gentlemen from New York; the Pullman Palace Car Company; the Woodruff Palace Car Company, for providing sleeping cars for the convenience of the Association; to the members of the Boston Press, for their careful reports and flattering considerations; to the proprietors of the American House, for their hospitality and good cheer, and to all others from whom favors and other at-

tentions have been received. The resolutions were unanimously adopted and ordered to be entered on the records of the Association. On motion of Mr. Forney it was voted that the thanks of the Association be returned to the various railroad companies who have passed the members over their lines to and from the convention, and to Mr. Robert Louden and other gentlemen for their attention to the ladies who accompanied the members during their visit to Boston.

The following named gentlemen were then elected officers for the ensuing year: President, J. W. Van Houten, of Pittsburgh, Pa.; Vice-President, V. D. Perry, of Hartford, Conn.; Secretary, Leander Garey, of Morrisania, New York; Treasurer, A. Steinbach, of Reading, Pa.

The Convention then adjourned.

EXCURSION TO NEWPORT.

The members of the Association were evidently very much pleased with their reception and Boston. Many of them had never visited Boston before, and expressed much surprise at the attractions of the city and suburbs. The Boston Executive Committee consisted of the following gentlemen: Mr. Henry C. Sherburne, Chairman; E. C. Perkins, Treasurer; Henry Knowles, Secretary, John A. Pingree, Robert Louden, A. S. Gear, Charles S. Knowles, H. L. Leach, H. K. Moore, S. H. Munson, S. A. Wood, F. A. Howard, John Hudson, George Buntin.

On Saturday morning the members of the Association took carriages from the American House for the Old Colony station, and from there a special train was provided by Superintendent Kendrick to take them to Newport. As soon as the train started they again became the guests of the New York Committee, which consisted of the following gentlemen: General E. S. Greeley, Chairman; Albert Brady, P. R. Wood, Colonel R. S. Ricker, C. Roby, L. Valentine and C. W. Kalkman. These gentlemen took the best care of the party of some 185 persons. After passing Fall River on the downward trip, three trials of the unimproved Westinghouse brake, which has been on this train for three years, were made with the following results: First trial, speed 35 miles an hour, time 33 seconds, distance 888 feet. Second trial, speed 35 miles an hour, time 31 seconds, distance 924 feet. Third trial, speed 33 miles an hour, time 27 seconds, distance 696 feet. There was a down grade of thirty feet at the time of the last trial. The party reached Newport about half-past eleven o'clock and found carriages in readiness in which they were quickly conveyed to the Atlantic House, where, after a short wait, a collation was served in the dining-room. The party then went to ride around the city in carriages, down the avenue, taking in a view of the prominent summer residences, and to other points of interest. The formal dinner was served about four o'clock, after which the party amused themselves until it was time to take the steamer Bristol for New York, at half-past eight in the evening.

The New Chicago Freight Tariffs.

Since the passage of the new law to regulate passenger and freight tariffs on railroads, the interested managers have had several conferences. From the first, the general sentiment was in favor of endeavoring to comply with the requirements of the law. Its constitutionality was not unquestioned, but prudent economy suggested that it would be better to accept its most unreasonable terms rather than risk the heavy penalties incurred by its violation, in case the Supreme Court should sustain the law. Community of interests prompted concert of action. It was, therefore, agreed that each company should get up a tariff to meet the varying circumstances affecting their particular lines, and that, when prepared, a general meeting should be held to compare tariffs and decide upon their adoption.

The freight agents then withdrew, to enter upon the most difficult task ever imposed upon them. There were sundry loopholes in the law of which they might have taken advantage, but the prevailing purpose was to conform to the spirit of the act. As Chicago is the great receiving and distributing point of the West, their aim was, if possible, to afford shippers far and near the easiest and most available means of transit to and from this city. With the Chicago & Northwestern Railway this was not a very difficult problem to solve, because from every point reached by it within this State it is the shortest route to Chicago. A distance tariff could, therefore, be profitably made. But with the north-and-south roads the case is quite different. Every dozen miles or so they are crossed by through Eastern lines. Take the case of the Chicago & Alton Railroad. At Bloomington it is intersected by the Indianapolis, Bloomington & Western and the Lafayette, Bloomington & Mississippi railroads, either of which companies make the same rate through from New York to Bloomington that is made by the Alton Railroad *via* Chicago. The latter being the longest, the short lines will be enabled, under the operation of the new *pro rata* law, to make a lower rate and thus take all the business; but they can maintain the rate just as high as will bring it a trifle under the rate established by the long road. This will be discrimination with a vengeance, under the operation of a law especially designed to prevent it! It will force the longest road entirely out of the competition and place it utterly at the mercy of the short route. For, rather than lower the general tariff of the road sufficiently to meet this competition and bringing it, at intermediate stations, to merely nominal figures, the companies will prefer to abandon the business at competing points and make up the deficiency its loss will entail by advancing the local rates.

The General Freight Agent of the Alton Road proposes to charge for business received at competing points and consigned to his local stations the same rate that would be charged from Chicago. This policy would violate the spirit of the new law, but he proposes to evade the penalties of its infringement by offering to take car-loads at 20 and 30 per cent. less than regular rates for first, second, third and fourth-class freight, and will offer this advantage to any one who can ship by car-load. The result will be that if a shipper at Springfield is able to patronize the road by the car-load, and a man at Lexington or any point 50 or 100 miles nearer Chicago cannot ship a like quantity, the latter will be compelled to pay a higher rate for a lesser distance than the heavier shipper for perhaps double the distance. And their justifiable excuse will be grounded on the wording of the law prescribing that for "like quantities," &c., a greater charge shall not be made for a lesser distance than for a greater.

The north-and-south roads will suffer most, but not alone. The Rock Island Company, for instance, will have to abandon the business of Peoria. Last year that station yielded the company $300,000. But the Toledo, Peoria & Warsaw Railway runs in an air line across the State, giving a shorter line to the East than by way of Chicago, and will, therefore, make a rate lower than the Rock Island Company can afford to touch. Their freight agent recognizes this barren fact, and like Mr. Smith of the Alton, and Mr. Tucker of the Illinois Central, is preparing to make good this deficiency by increasing the local rates sufficiently to maintain the revenue. The companies say they cannot afford to earn less than they have done hitherto, and that being compelled to abandon such a large portion of their business they would be justified in making good their losses by increasing the rates for short hauls.

This policy has one serious difficulty. If the companies suddenly advance their rates for short distances, will not the shippers arraign them before the courts, and be able to convince any jury that, if the rates charged for the past ten or twelve years were remunerative, their material advance now is extortion?

These views may yet be modified, as none of the tariffs—except that of the Northwestern Railway—are in print. That company assume an arbitrary rate to cover the expense of receiving, handling and delivering freight at the two stations where received and delivered. The whole tariff is then made by adding a fixed rate per 100 pounds per mile, varying according to classification. The result is somewhat to decrease the present rates and sensibly to equalize them, removing many causes of friction.

Special rates are entirely abandoned, except in cases cited where shippers contract by the car-load. Manufacturers along the several lines who have been encouraged in their hazardous enterprises by advantageous rates will have to grub along as best they can. The Railroad Commissioners have been approached on this point, and they take the high, philosophical ground that, if the manufactories cannot stand on their own bottoms, they had better fall; and, in regard to the north-and-south lines, they likewise assume that, if the lines were not properly located in the direct course of trade, the people are not to blame for the lack of foresight.

One other question has engaged the managers: The effect the law will have upon contracts made outside of Illinois. The Chicago, Burlington & Quincy, Rock Island, Northwestern and Illinois Central companies each have contracts with Iowa lines crossing them north and south, by which the business of these cross roads is transported to Chicago at a less car rate than the local rate between Chicago and the Mississippi. The contracts are made outside the State, but the performance is within the State, and therefore, as some lawyers affirm, subject to the law of the State. Others, equally versed in legal lore, contend that the question is beyond the jurisdiction of the State, being of an international character. The point made by the latter gentlemen is, that, were the roads to charge their regular distance rate, the business would be lost to the Chicago roads, which loss would benefit nobody; whereas, taking it at the best procurable rate does not injure or affect the people of Illinois, while it does help the roads by swelling their gross earnings and enabling them to transport their other business at lesser rates. This position was affirmed, by resolution, at the last general meeting of the managers.

It has been said that the roads can transport their business across Iowa at a merely nominal figure if they choose, and put on the full rate from the river to Chicago. The Rock Island and the Chicago, Burlington & Quincy companies can do this, because they own their Iowa lines; the Northwestern and Illinois Central cannot, because they lease their respective lines upon a certain percentage of the gross earnings, and the terms of the agreement demand a fair division.

It has also been stated that the north-and-south lines will secretly "pool" the business at the competing points with the east-and-west lines, and allow the latter to do all the business. Should the cross lines consent to this, they will display unprecedented magnanimity, for they have the Chicago lines at their mercy.

The struggle in regard to the Freeport business may be revived. The Illinois Central Company have a contract with the Chicago, Burlington & Quincy Company, by which all the business of the former, north and west of Foreston, is transported to Chicago for $9 per loaded car, a distance of 128 miles. When the new law comes in force, certain parties who are now paying the local rate of $20 and $30 per car propose to offer the Chicago, Burlington & Quincy Company the same car rate that is given the Illinois Central Company. In case the regular rate is exacted, they will appeal to the courts and ask the jurors to decide whether, if it pays the company to transport freight 128 miles for $9 per car, a charge of $20 per car for a lesser distance is not extortion. Presented thus, the jurors would not waste much time in recording an affirmative verdict. But the Chicago, Burlington & Quincy Company intend to deny that it is their road. They will claim that the Illinois Central Company make the rate with the shipper, and transact all the business; that the Chicago, Burlington & Quincy Company merely haul the trains, and that, practically, these 128 miles are a portion of the Illinois Central, and should be considered such. If this construction is not accepted, the company may fall back on the clause referring to "like quantities," and ask what individual shipper will contract to give them an equal quantity with the Illinois Central.

Some of the roads will not make their tariffs uniform over all portions of their line. The law refers to lines running in the "same direction." Thus, the Illinois Central will make a different rate on their main line to what is given on the branch, because the former runs S. S. E. and the latter S. S. W.—an exceedingly nice distinction, and one that the Northwestern could also make between its Freeport subdivision and the Dixon Air Line.

It will thus be seen that several knotty questions, with which the railroad solicitors are wrestling, can only be definitely settled after a fair trial of the law.—*Chicago Tribune, June 12.*

CHICAGO RAILROAD NEWS.

Michigan Central.

The contract has been let for the wood-work of the new car shops at Detroit, and also for the erection of the new round house. At the present time a section only will be constructed, sufficient to contain 22 stalls. Work on the Detroit River Tunnel has been resumed, upon a new plan.

Chicago & Pacific.

This company commenced on Monday, June 16, to run a mixed train from Elgin to Chicago. Before regular passenger trains are put upon the road, however, it must be ballasted.

Illinois Central.

The failure of the fruit crop in Southern Illinois has prevented the putting of a fruit train upon this road. The through freight trains, however, are so regulated as to run from the fruit district to Chicago in about 36 hours, thus rendering a fruit train not so essential as it was last year. The peach trees in Southern Illinois are almost all dead, and it will be years before a similar number will be growing again. The people in that portion of the State are going more largely than ever into the cultivation of strawberries.

Chicago & Paducah.

Work is at present being prosecuted on this road with much energy. About 100 miles of track in all has now been laid, and the rails put down at the rate of a mile per day.

Freights.

There has been no change of rates for a month. East-bound rates to New York are $1.60, $1.25, 85 cents and 45 cents respectively for the several classes. Lake freights are very low, compared with last year's rates, having touched as low as 5½ cents a bushel for corn to Buffalo.

The Chicago Spring Works last year turned out 500 sets of Daniels' patent springs and an average of nearly a ton a day of elliptic springs. The company intends shortly to erect new shops at Melrose, near Chicago, on the Chicago & Northwestern road.

The Quealy Iron & Car Works of Hannibal, Mo., have commenced work on their new foundry at Parsons, Kan., to which place the works are to be removed.

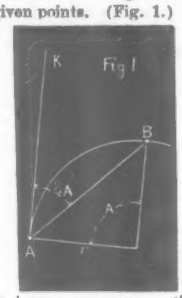
Contributions.

Problems in Railroad Location.

TO THE EDITOR OF THE RAILROAD GAZETTE:

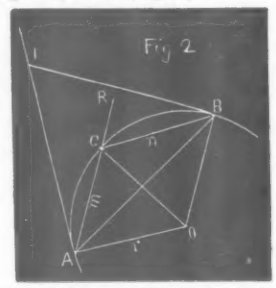
In a hilly region where the curvature of a proposed railroad must necessarily be great, curves being frequent and sharp, connected by short tangents, it will often be advantageous to locate two or more simple or compound curves independently and join them afterward. By this plan curves may be fitted in the field to a natural contour, and the best position for side-hill work in different places secured. The following problems are auxiliary to this purpose:

Problem 1.—To locate a circle of given radius so that it shall pass through two given points. (Fig. 1.)



Let A and B be the given points. Measure the distance $AB = c$. Then is $\sin \frac{1}{2} A = \frac{c}{2r}$, and the angle $\frac{1}{2} A$ being laid off on the proper side of AB will give the direction of the tangent AK to the circle at A, from which tangent the circle can be laid out.

Problem 2.—To find the radius of a circle which shall pass through three given points. (Fig. 2.)



Measure $AC = m$, $BC = n$, the angle $CBA = H$, and the angle $CAB = K$. Then is

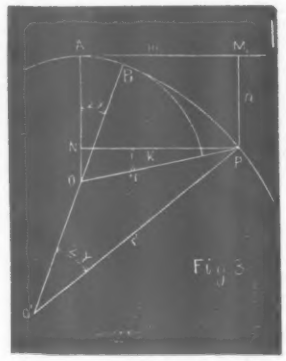
$$r = \frac{m}{2 \sin H} = \frac{n}{2 \sin K}. \quad (1.)$$

If A and B are not intervisible measure $BCR = H + K$ and the lines m and n. Calculate H or K by the formula:

$$\tan \tfrac{1}{2} (H \infty K) = \frac{m \infty n}{m + n} \tan \tfrac{1}{2} (H + K). \quad (2.)$$

Then find r as above.

Problem 3.—To locate a circle of given radius so that it shall pass through a given point and be tangent to a given circle. (Fig. 3.)



Let
$AM = m$
$PM = n$
$AO = r$
$BO' = r'$
$AOB = 2X$
$BO'P = 2Y$
$NOP = K$

Strike a tangent at any point, A, of the given circle and locate the point P by m and n.

Then we have

$$\tan K = \frac{r - n}{m}, \quad (1.)$$

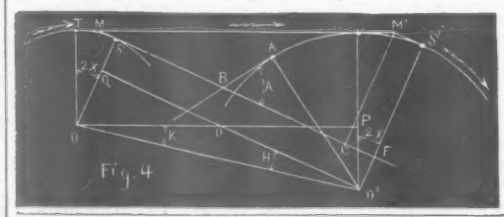
and

$$OP = m, \sec K. \quad (2.)$$

Now, in the triangle $OO'P$, we have given the side $OP = m$. sec K, the side $O'P = r'$ and the side $OO' = r' - r$. In this triangle find the angle $BO'P = 2Y$ and the angle POO'*. Then:

$$2X = POO' - K - 90°.\dagger \quad (3.)$$

Problem 4.—To locate a straight line so that it shall be tangent to two given circles. (Figs. 4 and 5.)



* By a well-known formula of plane trigonometry.

† The formulæ of this problem are adapted only to the special case represented by fig. 3. In general the only changeable parts are the algebraic signs, and those suited to any particular case may be determined from a rough sketch.

Choose a station, S, on the first circle as near as can be estimated to the tangent point, T, of the straight line, and a similar point or station, A, on the second curve. Measure the angle of intersection $ABC = A$ of the tangents at S and A;

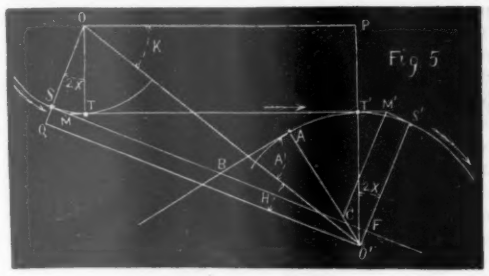


Fig 5

or, measure the angles ASB and BAS, and find $A = ASB + BAS$.

Next, find the point on the curve $S'A$ whose tangent is parallel to SB. To do this we have the central angle $AO'S' = ABF = A$. Then measure $SF = m$ and $S'F = n$.

Now, let $TOS = T'O'S' = 2X$ be the central angle through which we must turn from the station S to the tangent point T, or from the station S' to the tangent point T'. Also, let $QO'O = H$ and $POO' = K$, auxiliary angles; then

$$\tan H = \frac{QO}{QO'} = \frac{OS \mp O'F}{QO'} = \frac{OS \mp (O'S' - S'F)}{QO'}$$

or,

$$\tan H = \frac{r \mp (r' - n)}{m} \quad * \qquad (1.)$$

also

$$OO' = \frac{QO'}{\cos QO'O} = \frac{m}{\cos H}$$

and

$$\sin K = \frac{PO'}{OO'} = \frac{O'T' \mp OT}{OO'};$$

that is,

$$\sin K = \frac{(r' \mp r)\cos H}{m}. \qquad (2.)$$

Then

$$2X = POO' = QOO = POO' \pm QO'O,$$

or,

$$2X = K \pm H. \qquad (3.)$$

Calling $TT' = t$, the length of the tangent, we have $t = OO' \cos K$, or

$$t = m\frac{\cos K}{\cos H} \qquad (4.)$$

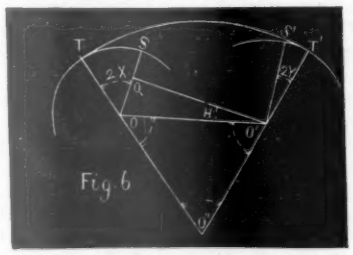
Two other equations may be used to check, viz.:

$$\sin K = \frac{(r' \mp r)\sin H}{r \mp (r' - n)} \qquad (5.)$$

and

$$\tan X = \frac{\sqrt{n[n \mp 2(r' - r)] + m^2} - m}{n \mp 2(r' - r)} \qquad (6.)$$

Problem 5.—To locate a circle of given radius so that it shall be tangent to two given circles. (Fig. 6.)



Proceed as in Problem 4 to find H and OO.

Let O'' be the center of the tangent circle r'' its radius, $2X$ the *central* angle through which we must deflect from the station S to the tangent point T', and $2Y$ the *central* angle subtended by the arc ST'. Then in the triangle $OO'O''$ we have already found OO' we know that $OO'' = r' - r$ and $O'O'' = r'' - r'$; therefore we can calculate the angles at O, O' and O''. Then (fig. 6) $2X = 180° - 0 - (90° - H)$,

or

$$2X = 90° - 0 + H, \qquad (1.)$$

also

$$2Y = 180° - 0' - (90° + H),$$

or

$$2Y = 90° - 0' - H. \qquad (2.)$$

Cheap Railroads.

[Continued from page 176.]

To the Editor of the Railroad Gazette:

Freight Business.—Most of the new, short and unballasted roads provide the same class and weight of machinery as that upon the old through roads. No one disputes the fact that the running expenses are less for the heavy train than for two light ones carrying the same tonnage, but another natural question arises, as to whether one 36-ton engine will not damage the track much more than two 18-ton engines, thereby largely increasing the road repairs, particularly upon unballasted roads, and more especially where there are but few trains run.

Most of the leading roads use upon their heavy grades large locomotives, and frequently tank engines on all drivers, to do their heavy work. And it is fair to ask the question, Why, if it is judicious and economical to use large engines built on that plan for heavy work, is it not equally economical to use light engines built on the same plan to do light work. To illustrate: the common 30-ton engine with two pairs of drivers has about 20 tons adhesive weight, equal to five tons upon each driving-wheel. The "consolidated," weighing 40 tons, upon four pairs of drivers, has the same weight per wheel, but twice the adhesive weight of the 30-ton engine. A 20-ton engine on the "consolidated" plan would have only 2½ tons on each wheel, with the same total adhesion as the 30-ton engine. What is the propriety of carrying the extra 10 tons dead weight and increasing the weight upon the wheel from 2½ to 5 tons? We know that reducing the wheel-pressure to 2½ tons would make a very great saving in the wear of rails, and believe that it would materially decrease the track repairs; and, as I remarked before, if the plan is economical for large engines, why is it not equally so for small engines?

In your reports of the Minnesota roads doing an average business of $2,500 per mile, you will, I think, find the same class of engines and cars as used upon the great through lines doing a business of $15,000 to $25,000. Those Minnesota roads are all now, and it is very doubtful if one mile in ten is ballasted. Suppose you were to put upon them rolling stock judiciously selected according to their business, would it not materially decrease their expenses and thereby greatly increase their profits? It is of course claimed, and justly, that all these roads will, in some future day, do a large business. You can then use this light machinery to advantage on accommodation trains, etc., and why bankrupt them now and destroy the iron, because at some future day they will want large trains, etc.? Why not do as all do in their private business, provide amply for the present and expand with the growth of business?

Most of the new roads remain years unballasted, and, therefore, the weight upon each wheel makes a material difference, especially in wet weather, when the ground becomes full of water, the ties cannot be properly supported, and therefore, frequently the rail supports become four feet apart, and frequently more, instead of only two. Increasing the number of drivers, you distribute the weight and relieve the strain upon the iron and ties, and thereby save a large amount of breakages of iron. Increasing the weight of the rail makes, if anything, the matter worse, as it becomes more rigid and will not yield, whereas a light rail may yield somewhat, and thereby receive some support from the intermediate ties. This fact was illustrated on the Reading Railroad where the average breakage for two years was, for the 45-pound rail, one bar in 8,619; for the 52-pound rail, one bar in 546, and for the 60-pound rail, one bar in 118—the 60-pound rail carrying about twice as many gross tons as the others, but the same number of engines and cars.

This distribution of weight will allow the rails to be worn out instead of being crushed out, as now. All, or nearly so, of the slow freight trains engines upon the Reading and the Baltimore & Ohio roads have three or four pairs of drivers, and if they can be used economically with the sharp curves upon those roads, why will they not work to a still greater advantage on our comparatively straight roads in the West? On an unballasted road a 30-lb. rail with 20-ton engines on all drivers is comparatively stronger than a 60-lb. rail with 36-ton engines with two pairs of drivers.

In referring to the light roads, I would not have you to understand that they should be badly built—quite the reverse: a one-horse wagon or a trotting sulky has better material in it and requires more skill in the workman than a six-horse wagon. So in building a cheap railroad the engineer must be skillful and attentive, examining the country thoroughly to see that he has the best possible location, and seeing that all his work is done in the very best manner. Any engineer, or anybody else with an abundance of money, can direct the building of a straight road between two points, but it requires skill and judgment to choose the best and cheapest route, in view of the length, curves and probable business; and a road judiciously constructed and worked will in almost all localities pay a fair interest on its cost. D. H. K.

* Throughout the demonstration of this problem the upper of the compos + ∓ sign will refer to fig. 4 and the lower to fig. 5.

OLD AND NEW ROADS.

Connecticut River.

The directors have voted to extend the second track, which is now being built from Springfield, Mass., to Holyoke (eight miles) to Northampton, nine miles beyond Holyoke.

Central Pacific.

Various reports have been afloat of the sale by Messrs. Huntington and Hopkins of their interest in the company. These reports have been denied, but it is said that an interest in the company has been purchased by four prominent capitalists of San Francisco (Messrs. Mills, Sharon, Reese and Coleman), and that they will soon take places in the board of directors.

Central, of Long Island.

This road is now open for 10 miles beyond the late terminus at Garden City, and trains are now running to Farmingdale. Two miles of the seven between Farmingdale and Babylon are graded, and work is proceeding rapidly on the balance.

Hamilton, Lacon & Eastern.

The contracts for grading and tieing the first division west from Chicago are made, and the contractors hope to have the road completed to the Desplaines River by August.

Minnesota State Railroad Bonds.

The St Paul *Pioneer*, of June 11, says:

"At the term of the United States Circuit Court, which commences its session in this city on Monday next, the 16th inst., a very important suit will be tried. We refer to the case of Selah Chamberlain against the Southern Minnesota Railroad Company and the St. Paul & Sioux City Railroad Company. This suit is brought by Mr. Chamberlain as holder of a large amount of the old Minnesota State railroad bonds against the present railroad companies, to whom the State, without consideration, transferred in 1864, all the lands, road-beds and franchises of the old land-grant railroad companies. These road-beds were all graded by Mr. Chamberlain, for which he received no pay except said State bonds. The State held a mortgage on the property of the old companies, to secure the payment of these bonds, and the companies never having paid any part of them, the State foreclosed the mortgage and bid in all the lands, road-beds and franchises in her own name, and held them in trust for the holders of these bonds, and the present suit is to enforce this trust against the present companies who, it is claimed, took the property with notice of the trust, and compel them to account for this large property, in order that it may be applied in payment of the bonds.

"The much-vexed question of the validity of these bonds will probably be decided in this case."

Laclede & Fort Scott.

The Circuit Court at St. Louis granted, June 13, a temporary injunction on application of Laclede County, Mo., to restrain J. E. Clark, Orville S. Grant, George S. Merrick and others claiming to be directors of the Laclede & Fort Scott Railroad Company, from holding an election in St. Louis, June 16.

Baltimore, Pittsburgh & Chicago.

The work on the Baltimore & Ohio Company's Chicago Extension is progressing rapidly. The work of track laying will be shortly commenced at Alma, O., the crossing of the Dayton & Michigan road, and pushed forward in order to facilitate the transportation of material for the road.

St. Louis, Kansas City & Northern.

It is reported that several of the prominent stockholders in this company will shortly take legal steps to secure an investigation into the affairs of the road. Some of the matters treated in the petition are said to be the sale of bonds and appropriation of the proceeds of the consolidation by the directors. This is said to be the way the State lien was acquired, and it is proposed to ascertain how far the directors of a railroad corporation can dispose of a company's real property without the sanction of the stockholders.

Jersey City & Albany.

The stockholders of the Ridgefield Park and the Rockland Central Railroad companies met in New York June 14, and voted to consolidate the two companies under the above name. The Ridgefield Park road, now nearly completed, extends from the New Jersey Midland above New Durham, N. J., north about 12 miles to the New York line. The Rockland Central is to extend from the New York line north to Haverstraw, N. Y.

Pennsylvania.

A certificate of the stock of this company which had been altered from one to one hundred shares was discovered in Philadelphia, June 14. It had been sold by one J. H. Horton at Jay Cooke's banking house.

Montreal & City of Ottawa Junction.

The contractors on this Canadian road are making fair progress. The line is finally located from the Quebec Province line to the Mahon River. The company hopes to have all, or nearly all, the grading completed this season.

Stockton & Visalia.

The Stockton (Cal.) *Independent* publishes in full the opinion of Judge Morse in the Stockton & Visalia Railroad Company's application for city bonds voted in aid of a railroad up the valley. He holds that a road running nineteen miles easterly to Peters' and thence fourteen miles southerly to Oakdale, is not a road "from Stockton up the San Joaquin Valley to (toward) Visalia," within the meaning of the law authorizing the subsidy.

Pacific of Missouri.

Application will be made to Judge Dillon, now holding the United States Court at Davenport, Iowa, for an injunction to restrain the Governor of Missouri from advertising this road for sale to satisfy the State lien, under the resolutions of the late Legislature of Missouri.

Union Pacific.

The monthly statement of the Land Department shows that the sales for the month of May were 10,423.71 acres, at an average price of $5.15½ per acre, the amount being $53,742.80. The sales averaged 76.08 acres to each purchaser. The total land sales up to June 1, 1873, were 725,332.57 acres, for $3,118,619.81, giving an average price of $4.30 per acre.

The total land grant of the company is about 12,000,000 acres.

Pennsylvania & Ohio Canal.

The trouble between the various companies contending for the possession of the abandoned canal promises to lead to a protracted law suit. The Youngstown, Newton & Ravenna Company has already taken legal steps to secure possession, and the Ashtabula, Youngstown & Pittsburgh and Mahoning Coal Railroad companies are about to take the same steps.

St. Louis & Leavenworth.

The city of Arrow Rock, in Saline County, Mo., has voted $75,000 in aid of the projected narrow-gauge road from St. Louis to Leavenworth.

Montpelier & Wells River.

The work is progressing satisfactorily and a locomotive has been placed on the track, which has been laid for a short distance.

Sault St. Mary Canal.

The contract for the new lock at the ship canal at Sault St. Mary has been let to Boyle & Roach, of Cincinnati, O. The new lock is thus described:

"The lock will be 80 feet wide at the coping, and 450 feet long, and will have a lift of 18 feet, with a depth of 15 feet of water on the mitre sill at ordinary low water. Each wall will be 22 feet high from the lower end to the foot of the stairway; 39½ feet high from the head of the stairway to the breast wall at the upper end of the foundation for the lock chamber, and 26½ feet high from this point to the upper end of the wall. The walls will be five feet thick. A set of guard gates will be placed 100 feet above the upper-lock gates, and another set 61½ feet below the lower-lock gates. The foundation is to be built with pine timber, twelve inches square, laid six inches apart, and the space between them to be filled up with concrete. The timbers are to be secured by bolts and fox-wedges, and to extend at least five feet under the wall. The gates are to run on rollers or tracks, and the towers which are used in supporting the present gates are to be dispensed with. The chamber is to be filled and emptied by tubes entering at the sides, instead of having valves, as in the gates of the old locks."

Grand Rapids & Indiana.

The compromise proposed between this company and the city of Kendallville, Ind., has been accepted by the authorities of the city. The substance of the proposition is as follows: The city of Kendallville is to issue $25,000 of its bonds to be paid in ten annual installments of $2,500 each, the first payment to be made on October 15, 1874, without interest, and 6 per cent. to be allowed after that date on all deferred payments. That puts a stop to the suit, which has been in the courts for a long time, and has caused a great deal of excitement along the road.

Keokuk & Kansas City.

The county court of Clark County, Mo., has ordered notice to be published warning all persons from negotiating 300 bonds of $500 each and 50 of $1,000 each ($200,000 in all) issued by Clark County to the Missouri & Mississippi (now the Keokuk & Kansas City) Railroad Company. The reason given for this notice is that the bonds were fraudulently obtained, and that the appointment of A. S. Tinsman, the financial agent of the county, who now holds the bonds, has been revoked. A suit to set aside and cancel the bonds is now pending.

[Continued on page 255.]

RAILROAD GAZETTE

Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Removals.—The Chicago office of the RAILROAD GAZETTE *has been removed to No. 77 Jackson street, opposite Third avenue.*

The New York office of the RAILROAD GAZETTE *is removed to Room 131, No. 73 Broadway, opposite the upper elevator landing.*

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

EQUAL RATES FOR EQUAL SERVICES.

"If a railroad company charges a dollar from Springfield to Chicago, and a dollar and a quarter for carrying the same package half as far, it proves either that it makes an exorbitant profit for the short distance—which we fully believe—or that it carries for less than cost for the long distance, which we don't believe it is foolish enough to do." This, or something like it, is a fair specimen of the reasoning of the Illinois farmer, who would prove beyond cavil that he is a sufferer from "unjust discriminations;" and the Legislature says that he has made a *prima-facie* case. It is very difficult to answer this reasoning, for, in the first place, having acknowledged the facts complained of, it is hard to get the average man to listen patiently to your argument. He will hoot in your face as soon as you open your mouth. It seems preposterous to him that there should be anything except injustice in that scale of charges which makes him pay more for carrying a bushel of corn fifty miles to Chicago than it does his fellow-farmer for carrying one a hundred miles. If by any chance his charges are reasonable, it seems to him inevitable that the other charges are unreasonably small. The farmer down the road has just the same service done, and fifty miles of hauling besides. No difference in cost of different parts of the road, no tale of varying grades and prevailing directions of traffic are of any avail. He sees plainly that in one case a greater service is rendered than in the other—a service which must cost the railroad company more than that for which he pays a higher price.

Now it well to ascertain definitely what is the essence of the demand which is thus made of the railroad company. It is not that it shall work without profit, or that it shall not earn a reasonable profit upon its capital. It is simply *that the rate of profit shall be the same to all persons and places.* You may make 8 or 10 per cent. on your capital; but you shall not make me pay 25 per cent. while my neighbor pays only 5 per cent. There must be no privileged classes or persons. Now this sounds very well. It seems altogether just. Why should one man or industry or place be favored beyond another in this service of transportation, which is as necessary as bread to all, and which perhaps only one corporation can do for us? Treat us all alike and we will not complain, provided that we are not taxed exorbitantly.

Now this seems reasonable, and to most farmers and to many business men, doubtless, it seems unanswerable; and perhaps he who would attempt to contradict it would seem too unreasonable to be listened to. Still, we venture to say that there is scarcely a farm in the country on which this principle of equal profits on all services is not violated yearly. And by this we do not mean that larger profits are asked on some crops than on others because of the risks involved, but that, risks and losses being averaged, the farmer habitually and deliberately affords certain products for a less profit on his capital and labor than he thinks reasonable to expect from others. This is not often obvious, it is true, and chiefly because the farmer does not often fix the price of his products when he sells them, while a railroad company, apparently at least, does fix the price of its services in each case. But it is true, nevertheless, and we shall try to make it clear.

For instance, most of the Illinois farmers have—or had until recently—besides the fields which have been plowed, and which yield grain crops or are devoted to meadows of what is known in the prairie country as "tame" grass, fields of arable land, perhaps poorer than the rest of the farm, which have never been "broken," and are covered with the wild prairie grass. These fields are largely devoted to pasture, for which, from the springing of the grass in the spring till the first frosts, they serve very well; only they afford a comparatively thin pasturage, and hardly half as many cattle or sheep are supported on them as if they were good timothy and clover meadows. Now, what we wish to call attention to is the fact that the farmer's profits on the products of these wild lands form a much less interest *on the value of that particular land* than the profits on the products of his plowed fields. He accepts a profit of a dollar an acre on prairie worth fifteen dollars, and expects a profit of three or four dollars an acre on fields worth thirty. And of course he does well. A farmer might with some show of reason be a little indignant at an attempt to set this forth. He would be an idiot did he not accept the dollar an acre, because otherwise that part of his farm would be utterly unproductive. How many thousands of Illinois farmers in days gone by have received no other income from considerable tracts of fine prairie land than a trifle paid to cut a few tons of wild hay from it. Yet they counted this worth having, because it was all they could get from the land under the circumstances.

Now it should be remembered that every railroad has its unproductive fields—sometimes needing only cultivation, but for the present yielding little or no return—and the demand for equal rates is virtually a demand that these fields shall be the standard by which the company's profits in all fields shall be limited, or that whatever these fields might afford be neglected.

In the case of the railroad, the importance of fields of small products is the greater, because often they are immense, numerous and growing greater and more numerous every day, and because its capacity is, or can easily be made, very much greater than its business. In this it is very unlike most farms. When once all his land is well cultivated, the farmer can only raise more by buying more land and hiring more men at an expense nearly as great per bushel and per animal raised as on the old farm. But most railroads could carry twice as much freight by adding less than one-half to the expenses. No road west of Chicago has as yet a double track throughout, and many could double, treble, or even quadruple their traffic without expending an additional dollar on their roads, except, perhaps, for a few sidings. The railroad is a very costly instrument, and to make the use of it cheap it is necessary to give it a great deal to do, so that the interest on its cost may be divided among a great many. And any traffic which pays any profit, however small, relieves the burden on the traffic paying the highest rate, for which primarily the road was constructed.

The Western railroads were constructed chiefly for the purpose of carrying grain and cattle from the prairies to the lake ports and the East, and lumber and merchandise from these ports and the East to the prairies. These staples produced and consumed by the prairie farms must support the roads until they can attract some other traffic. All such other traffic, at whatever rates, provided that they are greater than the expenses of conducting it, lessen the burden on all other traffic.

Should a gentleman construct a railroad from his office to his residence for his sole use, it is easy to understand that he alone would have to pay the interest on all the capital invested and the working expenses. Should a neighbor offer to pay one-third of the interest and expenses for the privilege of using it, he would lighten by so much the expense to the owner; and yet that would be an "unjust discrimination," in that the latter would be paying twice as much as the former for the same service. The case is precisely the same with a railroad for general traffic. Very great discriminations often may be made for the advantage of all customers of the road, and it would be hard to point out a case of a discrimination which could certainly and without evidence be called unjust. Not that unjust discriminations are not possible, nor that they are not made; only discriminations of almost every kind may be made and are constantly made which are for the general as well as the corporate good. Whatever the laws may say, varying charges for similar services are not *prima facie* evidence of unjust discriminations. The public has a right to complain of discriminations which are really unjust, and to make every effort to prevent them. By such discriminations a railroad company might often build up or destroy towns and industries at its pleasure. Let me fix the fare on my railroad to the suburban town I have laid out on my land lower than to any other towns reached by the same train, and I make a market for my lots and keep my neighbors from selling theirs; but that does not make it unjust for me to make a special suburban rate one-half or one-third as great as the ordinary fare, for by so doing I may build up an entirely new traffic with a considerable net profit, adding to the income of the road and diminishing thereby the amount that the other traffic must pay towards the interest on the investment.

THE MASTER CAR-BUILDERS' CONVENTION.

Conventions of railroad men follow each other in such rapid succession at this season of the year that it is difficult, even for those who attend them, to get a clear idea of their proceedings. Each of the different associations has a distinct field to which its investigations and discussions are or should be confined. Probably none of these are more important than the construction and maintenance of cars, which is the special department of the Master Car-Builders' Association. The number of cars of all kinds in use in 1871, as reported by Mr. Garey, was 252,122, and the number built since then has been 59,910, or an increase of nearly 25 per cent. These statistics will indicate the value of the property under the care of the master car-builders, and also the rate at which it is increasing. The importance of their transactions is therefore apparent, and appears more so if we refer to the table giving the dimensions of standard car-axles which we have already published, which shows the great diversity which exists in their form and proportions. The action of the Car-Builders' Association in establishing a standard for car-axles is, we believe, the most important step which it has thus far taken, as it is the beginning of a system of uniformity in the parts of cars, which each year grows more desirable. That such a system would result in very great economy in the cost of repairs of railroads there can be no doubt, and if the committee who were authorized to adopt a standard for a bearing and axle-box could make a good selection, the advantages conferred by the meeting of car builders would soon begin to be realized by their employers. Of course, if the action of the Car-Builders' Association is not seconded by railroad managers, the measures which have been adopted will be useless in accomplishing the end aimed at. As asserted by a resolution passed at the convention, the measures adopted in their convention are intended by the car builders only as recommendations to their superior officers. It therefore remains for the latter to give authority to what the former have done.

The report of the discussions on another page will indicate the great difference of opinion which still exists regarding an increase in the size of car-axle journals. Many members still seem to hold that an increase of the surfaces in contact will increase the friction, and others are doubtful whether the advantage which will be gained by more perfect lubrication, if the surface is increased by enlarging the diameter of journal, will be equal to what is lost by a reduction in "leverage" which follows such enlargement. It is therefore probable that some railroad managers will oppose the adoption of the standard axle on the same ground that many car builders did, and that they will assume that it is too large. It will only be necessary for those who believe that the journal is too large to study the subject of friction of journals with a little more care and without prejudice to be convinced of their error. In this connection we would also call attention to the experiments reported by Mr. Garey. He placed journals of three different sizes under the same car and subjected them to exactly the same wear. In running 28,122 miles, the brass bearing of the smallest, which was 3¼ inches in diameter by 5½ inches long, wore away *five* pounds; the second, which was 3¼ inches in diameter by 6½ inches long, lost

Fig. 1.

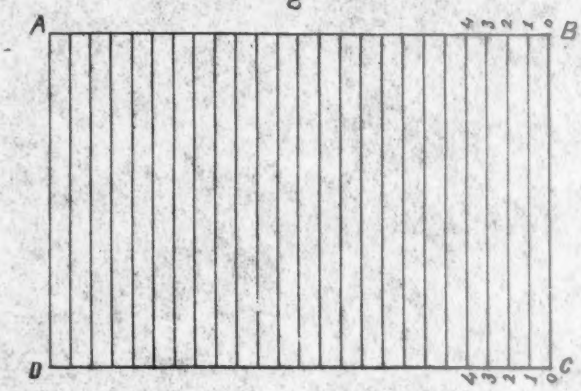


Fig. 2.

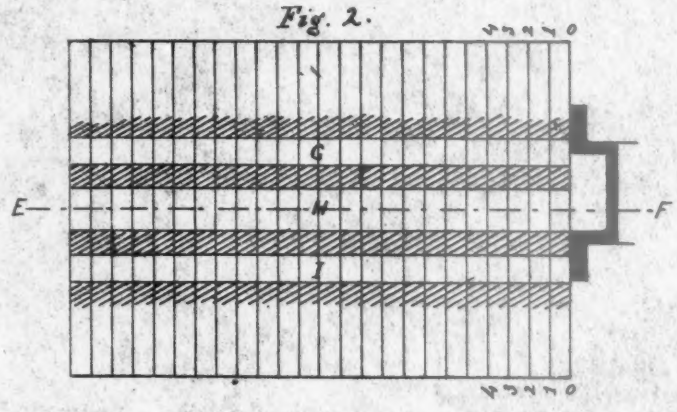


Fig. 3.

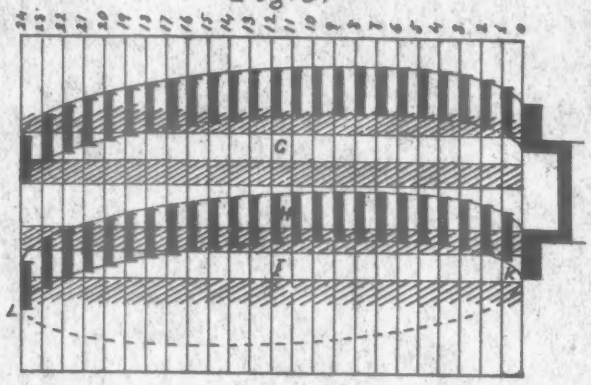
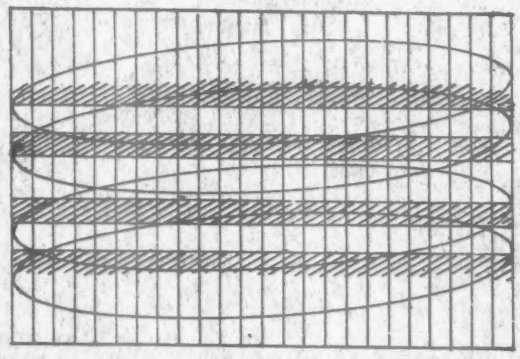
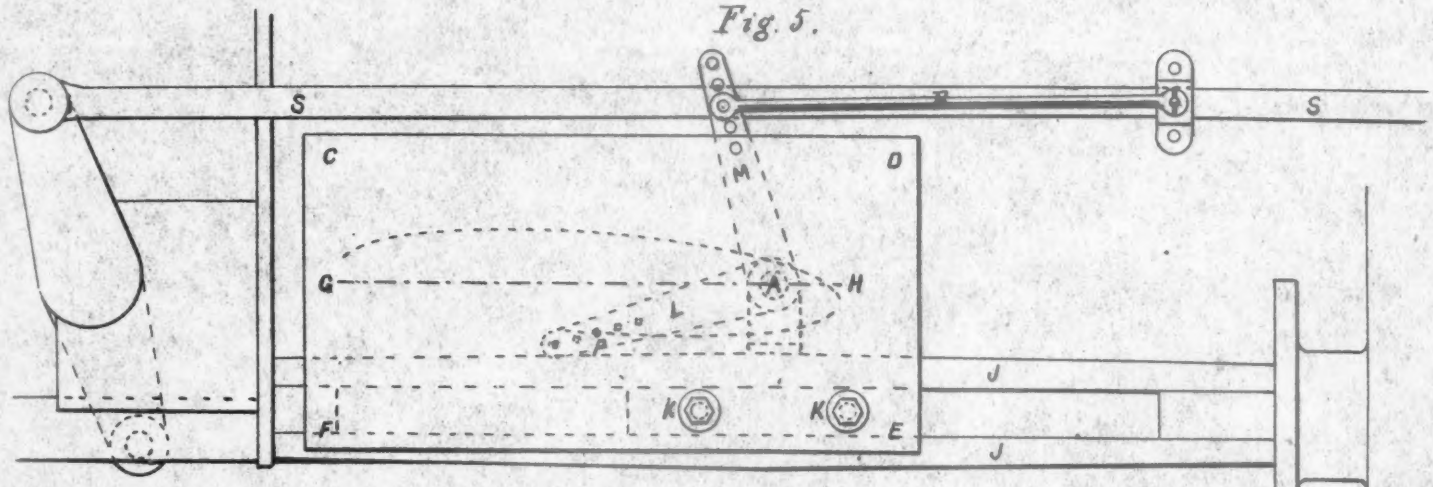


Fig. 4.



Scale 1½ in. — 1 ft.

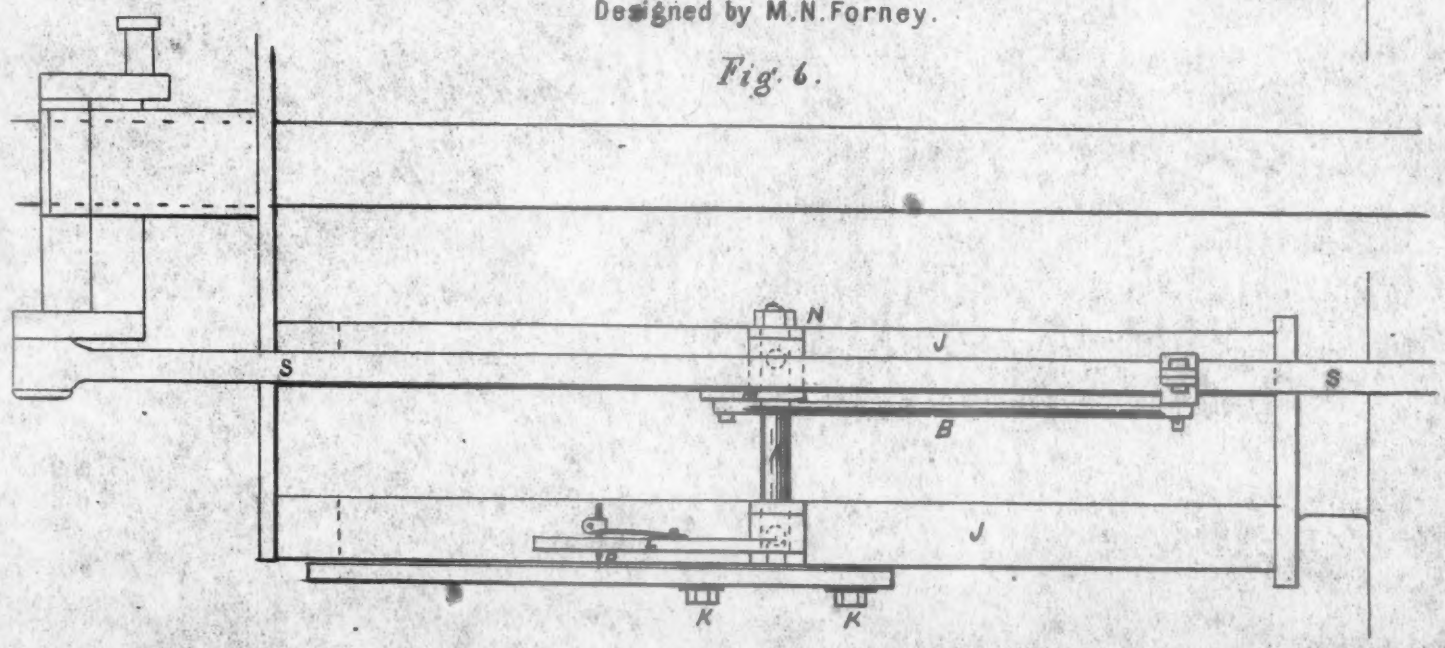
Fig. 5.



INSTRUMENT FOR TESTING THE MOTION OF SLIDE VALVES

Designed by M.N. Forney.

Fig. 6.



three pounds; and the third, which was 3¼ diameter by 7 inches long, lost only *two and a quarter* pounds from the same wear. It will thus be seen that so far as these experiments indicate anything they show that the larger the journal the *less* is the wear upon the brass. How far this increase can be carried to advantage the experiments under consideration do not indicate. They show very clearly, however, that the largest journal experimented with wore much less than the smaller sizes, which are those in ordinary use; and, therefore, that actual experience, as well as theory, favor the use of the large journal.

There are, however, other reasons which may deter managers from adopting the recommendations of the car-builders. On all of our larger lines some specific size or standard has been adopted and in use for a longer or shorter time, and to abandon it and substitute another will in all such cases cause great inconvenience and some loss. This condition of things prevails on a number of our leading lines. If it is allowed to stand in the way of accepting the form and proportions proposed by the car builders, then it will be impossible to adopt *any* universal standard. The different lines, to secure uniformity, must to some extent sacrifice their own convenience; and it should be kept in mind that the inconvenience resulting from making the change will each year be less and less, and ultimately disappear altogether.

In selecting a journal-bearing and box the committee have a difficult task before them. Opinions and practice differ much more widely in the design and form of these parts than with reference to the size of axles. An almost infinite variety of forms and devices are in use for journal-bearings, box-covers, dust-guards and methods of lubrication, so that it will be almost impossible, without the most careful investigation and experiment, to determine even approximately which give the best results. It is doubtful, we think, whether, with our present knowledge of the subject, it is wise to establish a standard form and design for these parts. With all the advantages which will result from uniformity, it must also be remembered that the adoption of fixed standards establishes a condition of stagnation in which there can be no improvement. It is quite true that the Committee will be able to select one out of a hundred or more boxes in use which will probably give as good results as any one of those from which it has been selected; but the adoption of that one will make it extremely difficult or impossible to introduce o hers which might be devised hereafter which would give much better results than any now used. We believe, therefore, that it would be very unwise if the Committee should decide the question over which they have authority without the most careful investigation and comparison of the boxes now in use.

With reference to the other questions discussed by the convention, but little decided action was taken. The report of the Committee on Ventilation contained a record of some experiments which will doubtless do much to draw attention to the importance of providing means of *admitting* fresh air into cars. They burned one and a half ounces of gunpowder in a seventy-six seat passenger car, with only exhaust-ventilators in the dome. It required from twenty to thirty minutes to clear the car, when running twenty-one miles per hour against the wind. A car of similar size, having ventilators through which air was admitted over the end windows, and exhaust-ventilators in the dome, running at the same rate of speed against the wind, had the smoke from the same amount of powder cleared out in from eight to ten minutes. It seems a little singular that it should be necessary to make such an experiment to prove that to keep the air in a car pure—that is, to remove that which is vitiated and supply its place with that which is not—it is necessary to provide a place for the one to *escape* and for the other to *enter*. The discussion of the amount of air required will also do much to attract attention to this subject, and lead car-builders to form more intelligent opinions and adopt more efficient devices for the ventilation of cars.

The recommendation of the committee that each train should be provided with axes and water-pails is certainly deserving of attention. There seems to be an excellent opportunity for some enterprising inventor or manufacturer to furnish an efficient wrought-iron stove, provided with the means for fastening it securely to the floor of cars. Such a stove in a collision would not be knocked to pieces and scatter its contents, and in the majority of accidents would probably not be broken loose from its fastenings.

Attention was called during the session to the immense loss of life and limb caused by the coupling of cars, and a a committee appointed on that subject. The members composing it certainly could not engage in a more philanthropic work. If the suffering and pain due to this one cause could be truthfully represented, it would make a picture so sad that the most indifferent would give some heed to it, and be disposed to aid the committee which has the matter in charge.

The plan proposed to the Association of holding an exhibition of car supplies and material during the next convention promises to become a very interesting feature. At the meeting in Boston the members were so much annoyed by the noise made by inventors exhibiting their wares that it became necessary to appoint some one to keep them quiet. The exhibition will supply a place for inventors, manufacturers and dealers to show their wares, and will to a great extent overcome the difficulty referred to, and promises to be profitable and useful to all the members.

The impression produced upon Bostonians by the meetings was very neatly summarized by the editor of the *Evening Transcript* as follows:

"The master car-builders made an excellent impression as masters in their line. Solid sense and independent judgment marked their discussions, and as little personality and feeling mingled in their expressions as could be expected from men of strong convictions and earnest purposes. Yesterday's debate on establishing a standard journal, box and axle, was a crucial one, for at the end of it every man was called on by name to declare his verdict and place himself on record before his employers and the traveling world on a matter where an eighth or a sixteenth of an inch of metal may be supposed to stand between some of us and eternity. Some boxes got a little heated during this run, and an unfortunate ruling or two of the Chair came near switching off the convention, but sound sense and a desire for fair play carried the matter through to a result and demonstrated the utility of such consultations."

Train Signals in England.

We find the following in an English contemporary:

"It is much to be regretted that up to the present moment most of the plans for insuring rapid communication between railway passengers and guards have proved failures. There can be little doubt that the obstacles interposed by the peculiar construction of English railway carriages are very great. It is even doubtful whether, in the case of a sudden and murderous onslaught, any communication with the guard could be acted upon with sufficient promptitude to be of much practical utility. The safest and most convenient railway carriage is the long *char-a-banc* in use in America, but it is very doubtful whether such a vehicle would be popular in England. John Bull likes to shut himself up in a box and 'keep himself to himself;' and the same feeling which makes the Briton eschew a *table d'hote* will probably impel the 'morose islander' to look askance at a long carriage in which 'all sorts of people' will get 'betwixt the wind and his nobility.'"

There are times when most of us feel inclined to sympathize with our cousins, as, for example, when we hear that their supply of coal is growing too small and their population too large; or when travelers come home and tell us that our convenient system of checking baggage is unknown in that country, and again when they make themselves unhappy about not having any efficient means of communication between passengers, "guards" and "drivers." One of the inscrutable mysteries to railroad men here is why our ordinary bell-rope will not answer the object sought.

The seclusion afforded by their plan of "carriage" as compared with our cars is, we believe, a delusion, as they would find after using what we are accustomed to here. The personal proquinquity which is incurred when four or five people sit face to face and the "interference" of the pedal extremities would be more objectionable to fastidious people here than the fact of simply occupying the same apartment with a greater number of people of various conditions in life. There is much less actual p rsonal contact and less reason for social intercourse in our cars than in those of the European plan. It is true that in this country there is no separation of the class of people who value cleanliness from those who do not, but the classification of cars, as is now common in England, would, to a very great extent, remedy that evil.

A Comprehensive Proxy.

One of the English jonrnals publishes the following as the form of proxy issued by the London agency of this company to the English shareholders, the words italicised having been marked by the shareholder who forwarded the proxy for publication:

"Know all men by these presents, that ——, stockholder in the Erie Railway Company, do hereby *irrevocably* constitute and appoint Peter H. Watson and Samuel L. M. Barlow, jointly and severally, —— attorneys and agents for ——, and in —— name, place and stead to vote as proxy at the *next* and at *any other election* of directors of the Erie Railway Company and for inspectors of election, and at *any* meeting of the stockholders of said company according to the number of votes and upon the shares of stock —— should be entitled to vote if then personally present as fully and in all matters as perfectly as —— could act if present, giving to ——, said agents and attorneys, and to each of them severally, *full power of substitution* and *revocation*, and hereby ratifying and *confirming all* that ——, said attorneys or either of them may lawfully do in the premises."

This would seem to give Messrs. Watson and Barlow eternal control of the voting power of such shareholders as give them such proxies, and forever deprive those holders of any other right than the acceptance of such dividends as may be made, and the selling of the shares. One might think some limiting clause must have been omitted by mistake; for it is not easy to believe that a proxy should be asked which could never be recalled by the owner of the shares, and would thus forever prevent his having a voice in the management of his property.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads, as follows:

Central of Long Island.—Extended from Garden City east 10 miles to Farmingdale, L. I. *Wisconsin Valley.*—Extended from the recent terminus northeastward 31 miles to Grand Rapids, Wis., 48 miles from Tomah. *Grand Rapids & Indiana.*—Extended from the winter terminus (16 miles north of Fyfe Lake) northward 6 miles. *Allegheny Valley—Eastern Extension.*—Extended from New Bethlehem eastward 20 miles to Brookville, Pa. *Cairo & Fulton.*—Extended from Benton southwest 19 miles to Rockport, Ark. *Chicago & Pacific.*—Extended from Roselle west by north 12 miles to Elgin, Ill.

This is a total of 98 miles of new railroad.

A Proposed Method of Testing Graphically the Actual Motion of Slide-Valves in Locomotives.

[A paper read at the Convention of the American Railway Master Mechanics' Association, by M. N. Forney, Mechanical Engineer.]

The manner of representing the movement of slide-valves by what are called motion-curves has often been described in treatises on the steam-engine. As some modifications in the application of this method of representing valve-motion are proposed, and as possibly some of those present may not be familiar with it, a brief description may not be amiss.

Let us suppose then that we want to represent by a drawing the movement of an ordinary slide-valve in relation to the piston during the whole of the stroke. To do this we will first suppose the parallelogram *ABCD*, fig. 1, to represent a section of a cylinder 16 inches diameter and 24-inch stroke. We will suppose the line *oo* to represent the position of the piston before the stroke is commenced, and 1 1 that of the piston after it has moved one inch, and 2 2, 3 3, 4 4, etc., the position after it has moved two, three and four inches respectively. Let us suppose now that the center line *EF*, fig. 2, of the cylinder is also the center line of the valve seat, and that the spaces *G*, *H* and *I*, between the horizontal lines and the shading, represent the ports. In order to indicate the position of the valve at the beginning of the stroke, we will draw a section of it on the line *oo*, which represents the position of the piston at the beginning of the stroke. It will be seen that it is shown with just sufficient lead to insure an opening of the steam port *I* at the beginning of the stroke. In fig. 3 the position of the edges of the valve in relation to the ports is shown in a similar way on the lines 1, 2, 3, 4, etc., when the piston has moved 1, 2, 3 and 4 inches, etc., of its stroke respectively. If the valve is represented in the proper position for each inch of the stroke, it is apparent that if we draw a curve, *KL*, through each position of the valve, it will represent accurately the exact distance that the port *I* is open at each point of the stroke. As every part of the valve moves simultaneously, if we draw corresponding curves for the other edges of the valve, they will show its position in relation to the exhaust as well as the steam ports during the whole stroke. Similar curves, represented by the dotted line *LK*, will show the motion of the valve during the return stroke, so that a diagram of this kind will represent the exact movement of the valve during the whole stroke of the piston. The curves alone, as represented in fig. 4, are sufficient to show the motion of the valve when this method is once understood.

The curves in the diagram are those due to an eccentric with five inches throw at full stroke. Of course at half stroke they would be of different proportions. There will also be a different curve for each position in which the link is worked. In determining the positions of the valve which is represented, no allowance has been made for the effect of the angularity of the connecting rod, the motion and proportions of the link, or other parts of the valve gear. To represent in a drawing the true position of the valve due to any given form of link-motion gear is in fact an extremely complicated problem, and in this consists the difficulty of representing with entire accuracy the movement of the valves by the method we have described. As we have already stated, the length of the connecting rod, the form, position, point of suspension and connection of the eccentric rods, the length and location of the rocker arms and axle boxes, and a number of other considerations of form and proportion, besides the lost motion and spring of the parts, all influence the movement of the valve. It is therefore manifestly almost or quite impossible to determine with absolute accuracy what the motion of a valve on a given engine is from what might be called graphic deduction.

It is the object of this paper, as its title indicates, to describe a proposed plan by which the actual motion of the valve can be drawn in curves, such as has been described, by the engine itself under the exact conditions of ordinary working. It is proposed to do this by attaching a small shaft, *A*, figs. 5 and 6, with two arms, *M* and *L*, one vertical and the other horizontal, to the guides. These arms must be of the same length. The end of the upper one is then attached to the valve stem by a short connecting rod, *B*, or other suitable means, so that the movement of the valve-stem will be imparted to the arm and shaft. Of course the end of the horizontal arm thus has exactly the same movement vertically that the valve-stem has horizontally with the very trifling inaccuracy due to the fact that the movement of the one is in a straight line, whereas the other is in the arc of a circle.

Now if we attach a board, *CDEF*, fig. 5, covered with paper, to the cross-head in the position shown, and a pencil, *P*, to the end of the horizontal arm, *L*, referred to, it is obvious that, as the board will move horizontally with the cross-head and piston, and the pencil vertically with the valve, the point will describe a curve which will represent accurately the real movement of the valve. It will show, not what the movement of the valve should or was expected to be, but what it actually is, and the influence of lost motion and all the other defects which may exist. Of course the valve can be worked at any stroke or point of cut-off, and a curve be drawn for each notch in the quadrant of the reverse lever, and for forward and backward motion.

After the diagram is drawn, the extreme movement of the horizontal arm should be noted, and the vertical arm then be

disconnected from the valve stem. The pencil should then be placed in a position midway between that of its extreme throw and the arm, and the shaft *A* then be fastened securely by a nut *N*, fig. 6. By moving the cross-head one stroke, the pencil will thus draw a horizontal line *GH*, fig. 5, which, if the valve throws equally each side of the valve-face, will represent the center line of the latter, and the curves which have been drawn will represent the motion of the center of the valve. The ports can then easily be drawn on the paper from this center line, and, by drawing the same curves for each edge of the valve, its actual motion in relation to each port and for each function which it has to fulfill can thus be accurately represented.

Of course if the valve throws unequally on each side of the center of the valve-face, allowance should be made therefor in order to arrive at correct results.

It is believed that this method of testing valve-gear will indicate more clearly than any other the defects which may exist, and that with the use of the indicator would frequently reveal the existence of very serious defects whose existence is often not suspected, or at least not known.

Very little claim for originality can be made for the suggestion, as it is simply an adaptation of a somewhat similar method, which has been used on models of valve gear, to the locomotive itself. It has, however, never to my knowledge been applied, as has been proposed in this paper; and if it should be found to be useful to any who are present, the object in preparing this description will be fully accomplished.

It is not patented, and therefore every one is free to use it.

Speed of Locomotives.

The Hartford *Courant* has been investigating the speed of locomotives, and reports as follows:

"Mr. Davidson, of the New York & New Haven Railroad, said that he never yet run an engine without cars attached as fast as it could go. The stories in the papers about an engine running eighty or ninety miles an hour are absurd. We have, he says, as good engines as any road in the country, and there are not many that can run over a mile a minute with a light train. An engineer who is getting all he can out of his machine is often very apt to find the second hand of his watch come around just a little before the mile post is passed. There is an impression prevalent that an engine will go faster with two or three cars behind just to steady it. This is a fallacy. Every ounce of weight detracts from speed. Express trains on this road used to run faster than they do now, but it didn't pay. In 1854, just before the Sunday night mail train was put on, there was an effort made by the four roads forming a connecting line between New York and Boston to see how fast a train could be run. The train consisted of only two cars, and no passengers were carried. On this road the engine "New York," B. H. Hunt, engineer, on the train's trial trip, ran from Springfield to Hartford, 26 miles, in 30 minutes, three minutes being lost in slowing down over the bridge at Warehouse Point. From Hartford to Meriden, 18 miles, the time was 22 minutes, and from Meriden to New Haven, a like distance, 20 minutes. This was certainly a great achievement for an engine with a 14-inch cylinder, 20-inch stroke, and 5½-foot driving wheel. After permanent arrangements were made for the train, each road was obliged to keep up to the time-table or forfeit $300 on each occasion when it was to blame for the delay. On the Boston & Albany road, the 54 miles between Springfield and Worcester were run by the engine "Whistler," 16-inch cylinder, 22-inch stroke, and 6½-foot driving-wheels, in 58 minutes. Owing to some mishap, the engine on the New York road did not make good time. One of the best runs on the road was made by the special train under charge of Superintendent Reed conveying the Grand Duke Alexis in 1871. The engine "Mercury," Engineer Patterson, made the run from New Haven to Meriden in 20 minutes, from Meriden to Hartford in 22 minutes, and from Hartford to Springfield in 30 minutes. Three or four years ago the engine "C. F. Pond" drew two cars with an excursion party to the Ætna peat works near Meriden, 14 miles, in 16 minutes, using peat as fuel. Mr. Reed's dummy engine is probably the fastest on the road. It has run from New Haven to Newington, 30 miles, in 31 minutes."

Railroads Forty Years Ago.

A writer in the Hartford *Courant*, in a conversation recently with some of the elder railroad officials of that city, derived some interesting reminiscences of the early days of railroad travel in the United States. We copy a portion of his account. The conversation began by a reference to the great advance made in railroad construction and equipment during the last twenty years. Yes, said one, there's been a great improvement since the Hartford & New Haven road was opened. It had then very meagre facilities, the road-bed was poor, had only strap rails, which were all the while curling up and running through the car floors, the cars were small and the locomotives weak. In fact it didn't take much to block a train in those days. Sometimes an inch of snow on rails would do it. Henry C. White, one of the first conductors on the road, tells how he and the baggage-master used to sit in front of the locomotive, one on each side, and brush off the snow from the rails with a broom as the train slowly crawled along. Each had a pail full of sand and sprinked a handful on the rail when necessary. The driving wheels (engines had only one pair then) used to slip round and round, and torment them almost to death. On one occasion a train got stuck on the Yalesville grade, by one inch of snow, and the wood and water gave out before the locomotive could overcome it. At last they got out the neighbors, yoked four pairs of oxen to the train and drew it, passengers, baggage and all, into Meriden with flying colors.

In the early days of the road the stage-coach drivers used to regard the cars with great contempt. Indeed, thirty years ago the passenger trains were three or four hours on the road to New Haven, and the stage coaches went in about the same time. Superintendent Davidson remembers riding with his father in a carriage drawn by two horses in 1840, which had a race with a passenger train near Wallingford, where the turnpike and railroad are parallel for three or four miles, and during all that time the carriage kept even with the train. There were only two trains each way daily then, both carrying passengers and freight. The old cars were divided into three compartments, opened on the side, and had twenty-four seats. The locomotives had only 12-inch cylinders, and no cabs to protect the engineer and fireman from the weather. The oldest locomotives were the "Hartford," "Quinnipiac," "Charter Oak," "New Haven," "Meriden," whose combined power would equal one of the splendid machines now in use on the road. The "Regulus," designed by General Superintendent Reed, and built in the company's shops in Hartford, one of the newest freight engines, will pull nearly one hundred cars with ease.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—The Jersey City & Albany Railroad Company, formed by the consolidation of the Ridgefield Park and the Rockland Central companies, met in New York, June 14, and elected the following directors: E. K. Alburtis, C. N. Jordan, D. E. Culver, F. J. Mallory, James A. Williamson, Wm. S. Banta, C. W. Alburtis, W. A. Shephard, James Tompkins. The board subsequently held a meeting and elected the following officers: President, E. K. Alburtis; Treasurer, C. N. Jordan; and Secretary, Jas. Tompkins.

—The Watsonville & Santa Cruz Railroad Company has elected the following directors: Claus Spreckles, F. A. Hihn, Benjamin F. Porter, Titus Hale, D. Tuthill and J. N. Besse: Treasurer, Titus Hale.

—At a meeting of the directors of the Maine Central Railroad Company in Portland, Me., June 13, Mr. Anson P. Morrell was chosen President, in place of Judge Richard D. Rice, who has resigned to accept the position of Resident Vice-President on the Pacific coast of the Northern Pacific Railroad Company. Mr. Charles F. Hatch, General Manager of the Eastern Railroad, was chosen General Manager of the Maine Central also.

—Mr. H. A. G. Pomeroy has been appointed Superintendent of the New York & New England (late Boston, Hartford & Erie) Railroad, in place of William M. Parker, who has gone to the Connecticut & Passumpsic Rivers road.

—At the annual meeting of the Montreal & City of Ottawa Junction Railway Company at Alexandria, Ontario, recently, D. A. McDonald, E. McGillivray, James Frazer, Archy McNab, Peter Kennedy, R. S. McDonald and John Rankin were elected directors. The directors elected the following officers: President, D. A. McDonald; Vice-President, E. McGillivray; Secretary and Treasurer, J. A. McDonald.

—At the annual meeting of the Chicago & Southwestern Railroad Company, June 11, the following directors were elected to serve three years: James N. Burnes, St. Joseph, Mo.; H. M. Aller, Leavenworth, Kan.; James F. Wilson, Fairfield, Iowa; B. F. Allen, Des Moines, Iowa; F. H. Tows, New York.

—Mr. W. H. Newman has been appointed General Freight and Passenger Agent of the Texas & Pacific Railroad, with headquarters at Shreveport, La.

—Mr. J. M. Morrison has been appointed Train Dispatcher and Superintendent of Telegraph of the Texas & Pacific Railroad, with headquarters at Marshall, Texas.

—Mr. T. Thwaites has been appointed Roadmaster of the Texas & Pacific Railroad, in place of J. H. Thompson.

—At the annual meeting of the stockholders and bondholders of the St. Louis, Jacksonville & Chicago Railroad Company, in Jacksonville, Ill., June 11, the following board of directors was elected: T. B. Blackstone, John Crerar, Chicago; George Straut, Peoria, Ill.; N. W. Green, Pekin, Ill.; Joseph Sawyer, Tremont, Ill.; L. E. Worcester, Whitehall, Ill., and Charles D. Hodges, Carrollton, Ill. These directors are all re-elected. The board subsequently met and elected George Straut, President; T. B. Blackstone, Treasurer, and R. H. Nolton, Secretary of the company, and Messrs Straut, Blackstone and Crerar the Executive Committee for the ensuing year. The company's road is leased by the Chicago & Alton and forms its Jacksonville Division.

—At the annual meeting of the Ashtabula, Youngstown & Pittsburgh Railroad Company in Ashtabula, O., June 4, the following directors were elected: Henry Hubbard, H. T. Morrison, A. C. Fish, F. Harrington, R. C. Newell, Henry B. Perkins, O. B. Wick, William Harbaugh, William Shinn, A. L. Crawford, William McCreery, W. L. Bissell and Thomas D. Messler. William McCreery was re-elected President; A. F. Hubbard, Treasurer, and Frank Silliman, Secretary.

—At the annual meeting of the stockholders of the Rhinebeck & Connecticut Railroad Company, held June 10, the following gentlemen were elected directors for the ensuing year: Edward Martin, H. H. Conklin, A. Wager, C. F. Young, Wm. H. Barnum, A. H. Vandling, A. Benson, S. D. Coykendall, Thomas Cornell, R. A. Wight, H. Schoonmaker, W. B. Platt, R. G. Townsend.

—The following is the new board of directors of the Utica, Ithaca & Elmira Railroad Company, elected June 11: Ezra Cornell, W. L. Burt, J. McGraw, J. Gauntlett, J. H. Selkreg, O. B. Curran, George J. Magee, Joseph Rodbourn, M. Bennett, James Rodbourn, R. M. Deull, H. P. Goodrich, C. C. Taylor; Inspectors of Election, F. C. Cornell, H. D. Donnelly, F. W. Curran.

—At the first annual meeting of the People's Narrow-Gauge Railroad Company in Tama City, Iowa, June 10, the following directors were chosen: G. S. Shaw, H. H. Andresen, C. C. Cock, Scott County, Iowa; J. B. Dougherty, L. H. Washburn, F. Bacon, Muscatine County, Iowa; J. M. May, Robert Grover, Cedar County, Iowa; W. B. King, R. Reichmann, Tama County, Iowa; S. Dice, Linn County, Iowa; S. La Rue, Benton County, Iowa; C. F. Clarkson, Grundy County, Iowa; J. L. Estes, Hardin County, Iowa. The board elected the following officers: President, W. B. King; Vice-President, H. H. Andresen; Secretary, R. Reichmann; Treasurer, C. F. Clarkson.

—The Kalama (Wash. T.) *Beacon*, of May 31, says: "It is announced that Captain J. G. Ainsworth, of Portland, Oregon, President of the Oregon Steam Navigation Company, has been elected a director of the Northern Pacific Railroad Company and appointed Resident Managing Director of the Pacific Division."

—At the annual meeting of the Franklin Telegraph Company in Boston, June 12, the following board of directors was elected: J. Duff, J. R. Duff, J. S. Fay, Oliver Ames, F. G. Dexter and J. W. Brown, of Boston; W. H. Guion, G. B. Grinnell and G. S. Bowdoin, of New York.

—At the annual meeting of the Mobile & Alabama Grand Trunk Railroad Company in Mobile, Ala., June 3, the following directors were elected: F. B. Clark, James Crawford, M. T. Taylor, C. W. Butt, John Reid, Jr., S. G. Battle, Thos. St. John, Henry Hall and Moses Waring. The only new director is Henry Hall, who takes the place of R. W. Smith. At a meeting of the board the following officers were elected: President, F. B. Clark; Vice-President, C. W. Butt; Secretary and Treasurer, E. M. Underhill; Executive Committee, John Reid, Jr., and Moses Waring. All were re-elected except Mr. Butt.

—At the annual meeting of the St. Johns Railway Company in Jacksonville, Fla., June 2, the following were elected directors for the ensuing year: P. H. Skidmore, John G. Long, H. Remer, P. H. Skidmore, Jr., and Dr. John Westcott. P. H. Skidmore was subsequently elected President; John G. Long, Esq., Secretary and Treasurer; and P. H. Skidmore, Jr., General Freight and Ticket Agent.

—The Kansas Midland Railroad Company was organized at Topeka, Kan., May 31, by the election of the following board of directors: Chauncey Vibbard, Archer N. Martin, J. K. Herbert, New York; E. W. Filer, Bridgeport, Conn.; H. Bartling, G. Newman, Ross Burns, A. D. Craigue, P. D. Cook, A. J. Huntoon, Alfred Ennis, C. N. Rix and R. D. Coldren, Topeka, Kan. The board of directors chose the following officers: Hon. H. Bartling, President; G. H. Newman, Treasurer; Chas. N. Rix, Secretary.

—The annual meeting of the stockholders of the Winona & Southwestern Railroad Company, for the election of directors, was held in Winona, Minn., June 2. The following were elected as directors: H. W. Lambertin, R. D. Cone, J. A. Mathews, John Robson, Wm. Mitchell, W. H. Yale, J. O. Easton, Wm. Windom, M. G. Norton, E. S. Youmans, H. W. Burchard, Thomas Simpson. At a meeting of the new board of directors, held on the same day, the following were elected officers of the company: President, Wm. Mitchell; Vice-President, E. S. Youmans; Treasurer, M. G. Norton; Secretary, Thomas Simpson.

—Messrs. E. W. Leavenworth and Frank Hiscock have resigned their positions as directors of the Syracuse Northern Railroad Company on behalf of the city of Syracuse, and E. B. Judson and John J. Crouse have been nominated to fill the vacant places.

—The first board of directors of the consolidated Cincinnati & Great Northern Railroad Company is as follows: Jackson Duncan, George G. Roberts, James G. Brady, Andrew A. McCarty, Pittsburgh, Pa.; Thomas P. Turpin, G. W. Moore, W. A. Weston, Greenville, O.; F. C. Le Blond, Celina, O.; Davis Johnson, Van Wert, O.; A. S. Latta, Defiance, O.; L. N. Keating, Hillsdale, Mich.

—Mr. John F. Duncombe, of Fort Dodge, Iowa, has been appointed Attorney of the Atchison, Topeka & Santa Fe Railroad Company and Superintendent of the Land Department, with office at Topeka, Kan.

—A circular from the office of the General Passenger Agent of the Atlantic & Great Western Railroad announces that Mr. John P. Horton, General Northwestern Agent of the road, will hereafter represent the passenger interests of the line in the territory west of St. Louis, including Texas, Missouri, Kansas, etc., in connection with the district formerly under his charge. His headquarters will be in St. Louis, Mo.

—The officers of the St. Louis National Stock Yard Company are as follows: President and Superintendent, Archer M. Allerton; Vice-President, J. B Dutcher; Secretary and Treasurer, R. M. Moore; Directors, Archer M. Allerton, A. Boody, Horace F. Clark, A. M. White, J. B. Dutcher, New York; H. H. Houstin, Philadelphia; J. N. McCullough, Pittsburgh; J. B. Browman, East St. Louis: Oscar Townsend, Cleveland, O.; A. Pierce, St. Louis. Messrs. Allerton and Dutcher are proprietors of the National Drove Yards in New York, and nearly all the other members of the board are representatives of the various roads leading to St. Louis.

—At the annual meeting of the Peoria, Pekin & Jacksonville Railroad Company at Pekin, Ill., June 12, the following board of directors was elected: Lucius Hopkins, Richard Arnold, James L. Constable, Edwin L. Trowbridge, Lebbeus Chapman, Jr., James F. Kelsey and John Allen. The directors subsequently elected John Allen President, and J. F. Kelsey Superintendent.

—At the first annual meeting of the Indianapolis, Streator & Northwestern Railroad Company at Buckley, Ill., June 10, Eli Strawn, W. L. R. Johnson, John A. Kopin, John B. Meserve, A. D. Loomis, G. C. Davis and William More were elected directors. The board subsequently met and re-elected Eli Strawn, President; W. L. R. Johnson, Secretary; John A. Kopin, Treasurer.

—At the annual meeting of the La Crosse, Black River Falls & Neillsville Railroad Company in La Crosse, Wis., June 13, the following directors were elected: D. J. Spaulding, W. W. Crosby, W. T. Price, O. S. Woods, James O'Neill, Abner Gile, G. C. Hixon, Alex. McMillan and Joseph Clarke. Mr. Clarke takes the place of R. Dewhirst, the rest being re-elected. The board re-elected the old officers as follows: D. J. Spaulding, President; W. W. Crosby, Vice-President; T. Rodolf, Secretary; G. Van Steenwyk, Treasurer.

—At the annual meeting of the Cayuga Lake Railroad Company at Aurora, N. Y., June 12, the following directors were elected: Henry Morgan, J. J. Thomas, Henry Wells, David Anthony, H. J. Grant, L. Freeman, T. D. Wilcox, A. H. Clark, S. Adams, James M. Cox, T. Delafield, Frederick Collins, Wm. B. Leonard. The directors chose officers as follows: President, Henry Morgan; Vice-President, J. J. Thomas; Secretary, C. H. Adams; Treasurer, T. Delafield.

—At a meeting of the board of directors of the Buffalo, New York & Philadelphia Railroad Company, in Buffalo, N. Y., June 11, Mr. S. S. Jewett was chosen Vice-President, in place of Henry A. Richmond, resigned. Mr. W. H. Glenny was chosen a director in place of Mr. Richmond.

—Mr. William Adams has been appointed Master Mechanic of the Missouri, Iowa & Nebraska Railroad, in place of George Q. Adams, resigned.

—Mr. Carleton Wheeler, late agent of the Michigan Central Railroad at Battle Creek, has been appointed Superintendent of the Joliet Division of that road, with office at Joliet, in place of Mr. C. Knowlton, resigned.

—Mr. W. B. Coffin, late Chief Engineer of the Leavenworth, Lawrence & Galveston Railroad, has been appointed Resident Engineer of the Susquehanna Division of the Erie Railway.

—At the annual meeting of the New York & Canada Railroad Company in New York, June 17, the following directors were elected: Thomas Dickson, A. A. Low, Henry A. Smythe, Christopher F. Norton, Wm. W. Coot, James C. Hart, Isaac V. Barker, Coe F. Young, George B. Warren, Rodman G. Moulton, Andrew Williams and John Hammond.

—At a meeting held June 11, Mr. J. H. Devereux was elected President and Treasurer of the Pennsylvania Petroleum, the Shenango & Allegheny and the Pithole Valley Railroad companies, in place of Mr. J. B. Hodgskin, resigned.

—S. Ross is President and W. S. Davison Chief Engineer of the Jersey Shore, Pine Creek & Buffalo Railroad Company.

—Mr. James W. Morris, late Chief Engineer of the Central Improvement Company, has been appointed Chief Engineer of the Shenandoah Valley Railroad, in place of George Barrett, resigned.

TRAFFIC AND EARNINGS.

—The earnings of the St. Louis & Southeastern Railway (consolidated) for the month of May were $119,757.74, or $343 per mile. The earnings for the five months ending May 31 were $522,519.58, or $1,497 per mile.

—The coal tonnage of the Philadelphia & Reading Railroad and branches for the five months ending May 31 was: 1873, 2,615,364 tons; 1872, 2,505,791 tons; increase, 109,573 tons, or 4⅓ per cent.

—The coal tonnage of the Delaware, Lackawanna & Western Railroad for the five months ending May 31 was: 1873, 1,236,141; 1872, 1,159,502; increase, 76,639, or 6⅔ per cent.

—The coal tonnage of the Delaware & Hudson Canal for the five months ending May 21 was: 1873, 1,165,676; 1872, 1,198,156; decrease, 32,480, or 2¾ per cent.

—The coal tonnage of the Lehigh Valley Railroad for the five months ending May 31 was: anthracite, 1,813,180; bituminous, 13,503; total, 1,826,683. For the same period last year the anthracite tonnage was 1,784,272, showing an increase this year of 28,908 tons, or 1⅔ per cent.

—The coal tonnage of the Lehigh & Susquehanna Division of the Central Railroad of New Jersey for the five months ending May 31 was: 1873, 1,170,764; 1872, 889,920; increase, 280,844, or 31⅔ per cent.

—The shipments of Cumberland coal for the five months ending May 31 were: by Baltimore & Ohio Railroad, 653,219

tons; Pennsylvania Railroad (Bedford Division), 37,679 tons; Chesapeake & Ohio Canal, 201,661 tons; total, 892,559 tons. Of this, 774,370 tons, or 86¾ per cent., passed over the Cumberland & Pennsylvania Railroad.

—The earnings of the Central Pacific Railroad Company for the month of May were: 1873, $1,356,378; 1872, $1,380,922; 1871, $892,341; decrease, 1873 from 1872, $24,544, or 1¾ per cent.; increase, 1873 over 1871, $464,037, or 52 per cent. For the five months ending May 31 the earnings were: 1873, $5,010,633; 1872, $4,370,343; 1871, $3,249,706; increase, 1873 over 1872, $640,290, or 14¾ per cent.; increase, 1873 over 1871, $1,760,927, or 54 3-16 per cent.

—The earnings of the Erie Railway for the week ending June 7 were: 1873, $401,555; 1872, $370,959; increase, $30,596, or 8¼ per cent.

—The earnings of the Kansas Pacific Railway for the first week in June were: Passengers, $37,067.25; freight, $37,349.63; mails, $2,055.31; total, $76,472.19. Of this amount, $5,412.48 was for transportation of troops, mails and government freight.

—The following additional reports of earnings for the month of May have been made:

	1873.	1872.	Inc.	Dec.	P. c.
Central Pacific	$1,356,378	$1,380,922	... ...	$24,544	1¾
Michigan Central	679,333	6 0 642	$78.691	.....	13⅛
Missouri, Kan. & Texas.	251,3 5	150,574	100,781	.....	66⅞
St. L., Alton & T. H., Br.	51.795	39,030	12,766	.....	32¾
St. L. & Iron Mountain..	230,300	187.625	42,675	.....	22¾
St. L., K. City & Northern	219,051	227,640	.....	8,589	3¾
St. L. & S. East. (St. L. Div)	68,582	38,874	29,658	.....	76¼
West Wisconsin.....	85,104	30,901	54,203	.....	75⅝

—The earnings of the Great Western Railway of Canada for the week ending May 30 were: 1873, £24,998; 1872, £21,097; increase, £3,901, or 18½ per cent.

—The earnings of the Grand Trunk Railway of Canada for the week ending May 31 were: 1873, £38,700; 1872, £36,500; increase, £2,200, or 6 per cent.

—The Buffalo *Courier* of recent date says: "The grain trade of Buffalo so far this season has been one of remarkable prosperity, and may be safely taken as an index to that of the State at large in this important branch of commerce. The receipts of grain by lake and Grand Trunk Railroad in May this year were no less than 7,417,917 bushels, being nearly 1,500,000 more than in the same month last year, when they were 6,083,563, but even then about 1,500,000 more than in either 1871 or 1870. The increase this year is chiefly in wheat. A similar comparison for the five months ended on 1st June inst. with the corresponding period of last year is more than equally favorable to the present. The increase here is also chiefly in wheat. The aggregate receipts of flour and grain from all sources in May were much larger than in the same time during any year for the last ten years, and about 1,500,000 bushels more than in 1872. A comparison for the first five months of this year with those of last is even more favorable to the present. The exports of grain this year by the Erie and Central railroads from the elevators of this city, to the 1st inst., amounted to 1,961,653 bushels of grain, against 1,541,972 last year at the corresponding date. Last year navigation of the canal was opened on the 13th of May, but this year not until the 15th; yet, notwithstanding this, the exports by the canal this year up to May 31 were 4,650,130 bushels, against 2,995,230 up to June 1, last year. The number of canal boats cleared in May, 1873, was 763, being an increase of 227 over those in 1872. The amount of tolls received at Buffalo up to the 1st inst., this year, was $122,834.86, while last year it was only $87,496.57, notwithstanding the latter included two days more of navigation."

PERSONAL.

—Mr. A. R. Mapes, late Division Superintendent of the Western Division of the Missouri Pacific road, was presented with an elegant carriage at his house in Wyandotte, Kan., June 10, by the employees of his old division.

—Mr. A. N. Ramsdell, President of the New London Northern Railroad Company (and also of the New London City Bank), died at his residence in Connecticut, June 11.

—It is announced that Mr. John F. Tracy will resign his position as President of the Chicago & Northwestern Railway Company, to which he was re-elected on the 6th inst., and that the board of directors will choose his successor at a meeting this week.

—There will be a meeting of the Atlantic & Pacific Railroad Company on the 24th, at which it is supposed that Mr. Alden B. Stockwell's resignation of the presidency will be accepted. Mr. Jacob Sleeper, of Boston, declines re-election as a director.

—Mr. A. A. Witter, Train Master at Harrisburg, Pa., on the Northern Central Railway, has resigned his position and gone into private business.

THE SCRAP HEAP.

Westinghouse Brake in Mexico.

Mexican newspapers of the 9th of May notice that Mr. M. V. B. Shvaer was at the shops of the Mexico & Vera Cruz Railroad in the city of Mexico fitting the passenger stock of that road with the Westinghouse air brake.

Railroad Manufactures.

The Indianapolis Car Works have just completed their buildings and will shortly commence work. The buildings comprise an erecting shed, 50 by 175 feet; a carpenter shop, 20 by 315; a foundry and boiler shop, 20 by 315; a machine and blacksmith shop, 60 by 315; a paint shop, 50 by 100; a pattern shop, 60 by 85, and an office. The power is furnished by a 200-horse-power engine. There is also a large kiln for drying lumber. The company expects to employ some 700 men.

The Chicago Steam Forge Works, owned by Pynchon & Willard, have four steam hammers and turn out about 40 car-axles a day.

The Illinois Steam Forge Company, in Chicago, have turned out, during the past 18 months, 8,600 car-axles and 306 tons of heavy forgings. The company has purchased a tract of land at South Chicago and purposes putting up new works there.

Work has been commenced on the new car works at Oxford, Pa., on the line of the Philadelphia & Baltimore Central road.

OLD AND NEW ROADS.

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Kansas Pacific.

A suit against this company and a number of other defendants has been commenced in the United States Courts, Kansas, by the heirs of Samuel Hallett, who owned the majority of the stock of the Leavenworth, Pawnee & Western Railroad Company, which afterward became the Union Pacific, Eastern Division and later the Kansas Pacific. It is alleged that Hallett made arrangements with John D. Purdy and the Exchange Bank of St. Louis to procure money for the construction of the road and pledged with them a large amount of United States bonds. The money was not obtained and he made further arrangements with other parties, pledging them with $5,000,000 in stock of the company. After Hallett's death in 1864 it is claimed that his widow was induced by false representations and false legal proceedings to surrender his contract for the construction of the road, and that the $5,000,000 of stock belonging to the estate was absorbed by fraudulent judgment. At the time of Hallett's death the first 40 miles of the road were nearly completed. The complaint charges that after the defendants had thus got possession of the stock and contract belonging to Hallett they then made contracts with R. M. Shoemaker & Co., for their mutual benefit, and realized in stock, bonds and money over $15,000,000 profits, which is claimed to have been received by them as the trustees of Hallett, and to be held in trust for his estate and children, who bring this suit, and ask that defendants be compelled to render an account. The defendants, beside the company, are parties who were concerned in the construction of the road.

St. Louis National Stock Yards.

The stock yards of this company at East St. Louis are rapidly approaching completion. The company owns two tracts of land—one of 400 acres, on which the yards are situated, and one, for grazing purposes, of 256 acres. The yards now building cover some 70 acres. There are four main avenues and numerous alleys. There are 137 separate cattle yards, varying in size from 80 by 196 feet to 40 by 91 feet, with a capacity for 18,000 cattle. The hog house is 1,122 feet long and 100 wide, and has 121 pens, 103 of which are 16 by 44 feet and 18 are 32 by 44 feet. It will hold 15,000 hogs. The sheep house has 47 yards, 14 of which are 32 by 44 feet, and 33 are 16 by 44 feet. There is also a very large stable for horses and a hay-barn. A hotel four stories high, with Mansard roof, and capable of accommodating 200 people, has been erected, and there is also a banking or exchange office. The scale house contains a large scale, which can weigh 60 tons. The cattle yards are all paved, and the drainage arrangements are good. All the roads leading to East St. Louis have or will shortly lay branch tracks into the yard. The capital of the company is $1,000,000, and over $500,000 has already been expended on the yards, which will be opened July 1.

Whitewater Valley.

A number of the Boston holders of the bonds of this company have served notice on the trustees under the mortgage requiring them to take steps to foreclose the mortgage, the company having made a default in the payment of interest, and having also failed to set apart a sinking fund as required by the mortgage.

Portland & Ogdensburg.

Engineers are now engaged in surveying two routes from the Twin Mountain House to Dalton on the Connecticut River. One route starting from Dalton follows the Boston, Concord & Montreal Railroad to Whitefield, and then goes by a short cut up Little River to Carroll. The other route leaves the Montreal Railroad near the Dalton line and goes directly through the village of Whitefield to John's River, and then follows the river to the vicinity of the Hazen mills, when it strikes into the Carroll stream and follows it to the Twin Mountain House. The latter route is a mile and a half longer than the former, but of easier grade.

Elko & Hamilton Narrow Gauge.

The present prospects of this road do not seem to be very brilliant, if they can be judged by the following extract from the Eureka (Nevada) *Sentinel*:

"For our own part we have never had much faith in this proposed narrow gauge. The professions of Messrs. Gilmer and Salisbury partook too much of the bombastic to inspire confidence. For instance, they represented, and actually displayed a telegram to that effect, that 60 miles of the iron was *en route* overland prior to the passage of the bill by the Legislature last winter. That iron has not made its appearance yet. Again, but a short time since, they caused to be telegraphed all over the country that several car-loads of horses, carts and other material had been received at Elko. The real truth of the matter was, that they had simply sent down a buggy team from Ogden, with which Mr. Salisbury is now making a tour of the country between Pioche and the railroad. It cannot be said, however, as the *News* seems to conclude, that the enterprise has been entirely abandoned. Gilmer and Salisbury are as willing now as ever before to build the road—provided somebody will furnish the money."

Long Island.

The Boston express train will not be put on the road before July 1. A steamboat will run from Greenport to Newport, R. I., in connection with this train.

Dividends.

The Connecticut River Railroad Company has declared a 5 per cent. semi-annual dividend, payable July 1.

The Philadelphia, Wilmington & Baltimore Railroad Company has declared a semi-annual dividend of 4 per cent., payable on and after July 3.

The United States Rolling Stock Company has declared a dividend of six per cent. in gold for the six months ending June 30. The dividend is payable after July 1, at the company's office, No. 74 Wall street, New York.

The Delaware & Hudson Canal Company will pay a half-yearly dividend of 3½ per cent. on the shares of the Albany & Susquehanna Railroad Company, and of 4 per cent. on those of the Rensselaer & Saratoga Railroad Company, July 1.

The Fitchburg Railroad Company has declared a dividend of $4 a share, payable July 1.

New Haven, Middletown & Willimantic.

A meeting of the directors was held in New York recently to provide means for paying the past due interest on the bonds. It is said that an equipment company has been organized to provide the necessary equipment for the road.

Consolidation of the Delaware, Lackawanna & Western and Lackawanna & Bloomsburg.

It is officially announced that a consonsolidation of these two companies has been agreed upon and has been ratified by the requisite vote of the stockholders of both companies. By the terms of the consolidation the stockholders of the Lackawanna & Bloomsburg Company will exchange their shares for an equal number of shares of the Delaware, Lackawanna & Western. The capital stock of the Delaware, Lackawanna & Western is $20,000,000 and that of the other company $3,500,000, making the capital stock of the consolidated company $23,500,000. The bonded debt of the Lackawanna & Bloomsburg Company, which is assumed, amounts, after deducting the sinking fund, to $1,512,000. The name of the consolidated company will continue to be the Delaware, Lackawanna & Western.

The Lackawanna & Bloomsburg Railroad extends from Scranton, Pa., southwest to Northumberland on the Philadelphia & Erie, a distance of 80 miles. It is of 4 feet 8½ inches gauge (that of the Delaware, Lackawanna & Western being 6 feet) but has a third rail for 6 feet gauge from Scranton to Kingston, 17 miles. The road is well equipped, having at date 26 locomotives, 12 passenger, 200 freight and 1,400 coal cars, with well furnished repair shops at Scranton. The gross earnings for the last year reported were about $11,000 per mile. The principal business is in anthracite coal.

Keyport & Camden.

Surveys are now being made for an extension of the Freehold & Keyport Railroad to Camden, N. J. From Keyport south to Freehold (11 miles) much of the work is done. From Freehold the line will run south to Manchester, on the New Jersey Southern, and thence southwest through Medford to Camden. The whole distance from Keyport to Camden will be about 71 miles. The line from Freehold to Manchester (16 miles) is nearly parallel and not far from the New Jersey Southern, and for some 10 miles southwest of Manchester the line must be close to that of the New Jersey Southern's Pemberton Branch.

Jersey Shore, Pine Creek & Buffalo.

A correspondent informs us that ground was broken for this road June 12 by the contractors, Wilcox & Murphy. The work will be pushed forward as rapidly as circumstances will permit. The line of the road is from Williamsport, Pa., west through Jersey Shore to Pine Creek and thence northward up that stream to the summit, with an average grade of 15 feet per mile, and thence westward through Coudersport to Port Allegheny, on the Buffalo, New York & Philadelphia road, 96 miles south of Buffalo. The road will have light grades (nothing more than 15 feet per mile), and it is said will open up a large coal territory along Pine Creek.

Atlantic & Great Western.

The coupons of the first mortgage bonds falling due July 1 will be paid on and after that date at the office of the company, No. 74 Wall street, New York.

Pittsburgh, Washington & Baltimore.

The negotiations for some weeks in progress between this and the Pennsylvania railroad companies, looking to a mutual understanding in regard to the freight and passenger rates, have been concluded. Both companies will hereafter be governed by the same schedule rates on freight east from Pittsburgh and on coal and coke carried to Pittsburgh.

Gilman, Clinton & Springfield.

The Springfield (Ill.) *State Journal* announces that this road has been leased to the Pennsylvania Company in perpetuity, and that the latter company binds itself to run trains through from Springfield to New York by way of Logansport, Columbus and Pittsburgh without change of cars. The contract is to be submitted to the stockholders of the Gilman, Clinton & Springfield Company at their annual meeting, which will be held July 10.

St. Louis, Kansas City & Northern.

A special meeting of the stockholders is to be held at the office of the company in St. Louis, June 21, "for the purpose of devising ways and means for the completion of the new machine shops of the company at Moberly; the construction and completion of about eight miles of road in Clay County, Missouri, and about two miles of road in St. Louis; for the purchase of additional grounds in St. Charles and Kansas City; for the erection and construction of additional depot and warehouse accommodations, and for other purposes."

Maine Central.

There have been many rumors of the lease of this road to the Eastern Railroad Company, but no official notice of any such lease has been made. The recent election of Mr. Charles F. Hatch, General Manager of the Eastern road, to be General Manager of the Maine Central also, seems to indicate that the two roads are at least to be operated in harmony.

International Bridge.

The first span of this bridge over the Niagara River near Buffalo was completed June 9, and the false works for the next span have been put in position. The crib or coffer dam for the last pier was safely moored in position June 12, and Gzowski & Co., the contractors, are pushing forward the work on the pier as fast as possible.

The approaches to the bridge for the Great Western and Canada Southern roads at the Canada end of the bridge are already being constructed.

Berks County.

An attempt was made by the Philadelphia & Reading Company to delay the construction of this road through the city of Reading by building sidings across the main line of the Berks County road, but it was not successful. The Reading *Eagle* of June 14 says:

"The Berks County road is completed through the city, except crossing one or two sidings, as far as Second and Franklin streets on the south, and as far as the east side of the West Reading road on Front street, opposite the paper mill, on the north. The two parts can easily be joined together at the pleasure of the Berks County road, which will then be completed through this city."

Potomac & Manassas Junction.

Work has been commenced on this road at Quantico, Va. The line of the road is from Quantico, on the Richmond, Fredericksburg & Potomac, northwest, crossing the Orange & Alexandria near Bristol, and through Leesburg to the Potomac near Point of Rocks. At the Potomac connection will be made with an extension of the Frederick & Pennsylvania Line Railroad.

Pennsylvania & Ohio Canal.

A correspondent of the Cleveland (O.) *Herald* speaking of the contest for the possession of the abandoned canal near Youngstown, O., says: "As between the Painesville & Youngstown Railroad Company and the Youngstown, Newton Falls & Ravenna Railroad Company there is not much contest; they are willing to divide with each other. But it is said the Ashtabula, Youngstown & Pittsburgh Railroad Company claim to have exclusive right to the land purchased by it, and that having so appropriated said land to the use of its road, no other company can appropriate it or any part of it, although it may be wide enough to accomodate half a dozen different railroad tracks. One strip purchased by this company lies north of the Spring Common bridge, and occupies the whole space between the water in the river and its present track at the foot of the high bank on the east. It has started a switch, commencing some distance north of the bridge, striking out from its track, across the canal to the tow-path, which is next the river, and continuing this switch along the tow-path, under the bridge to a junction with the main track at the south end of the drawbridge by which the track crosses the canal, thus occupying actually at two points, and theoretically the rest of the way, the entire space between the water in the river and the high bank, and, if the company is right in its law, completely preventing any other company from using the canal at this point, or constructing a road on their own portions of the canal without a heavy cost in getting round other portions owned by other companies."

The Ashtabula, Youngstown & Pittsburgh Company (whose road is leased by the Pennsylvania Company) some time since purchased of the original owners, or their heirs, their right to portions of the land over which the canal was built, and now claims the land on the ground that the canal company owned only the right of way and that the land reverts to the original owners on the abandonment of the canal. The Youngstown, Newton Falls & Ravenna is a company which purposes to extend the Mahoning Coal Railroad southeast to the Pennsylvania line, and it is said to be working in the interest of the Lake Shore & Michigan Southern Company.

St. Joseph & Denver City.

A statement excusing the non-payment of interest by this company has been made by one of its directors. He claims that the parties who contracted to furnish the iron did not complete the delivery until some four months after the time agreed upon, which delay increased the expense of construc-

tion very largely and caused much business to be diverted to other lines, in consequence of the delay in completing the road.

The company was first organized under its present name May 12, 1862, having been previously known as the Marysville & Roseport Railroad Company. The line was intended to run from St. Joseph, Mo., to Fort Kearney, Nebraska, a distance of 271 miles. The first portion built was that between St. Joseph and Marysville, a strip 112 miles in length, and known as the Eastern Division. On this portion, first-mortgage bonds for $1,500,000 were issued. The line from Marysville to Fort Kearney, in Nebraska, 160 miles in length, is known as the Western Extension, and upon this road $5,500,000 first-mortgage bonds were issued. These bonds were to bear 8 per cent. interest in gold, but default was made last March. The completed portion of the road is 226 miles long, and extends from St. Joseph northwest to Hastings, Neb., which is on the Burlington & Missouri River road in Nebraska, and 40 miles east of Kearney Junction.

Wisconsin Valley.

This road is completed from Tomah, Wis., on the La Crosse line of the Milwaukee & St. Paul northeast to Grand Rapids, a distance of 48 miles. The road from Tomah to Grand Rapids was opened for business June 16.

Cincinnati & Great Northern.

The directors of this Michigan company and the Ohio company of the same name met in Hillsdale, Mich., June 7, and adopted articles of consolidation. The stockholders of the Ohio company will meet in Greenville, O., July 18, and those of the Michigan company in Hillsdale, Mich., August 27, to vote on the consolidation.

Contracts.

Proposals are asked for grading the road-bed for a horse railroad about a mile long near Rondout, N. Y., to include some masonry and trestle work. Messrs. R. Sayre, Jr., of Newark, N. J., and Daniel S. Van Buren, of Kingston, New York, receive bids.

People's Narrow Gauge.

Surveys are being made for the line from Davenport, Ia., northwest to Iowa Falls, passing through Wilton, Tipton, Cedar Bluffs and Norway. The Chief Engineer reports that he has found a very favorable line.

Shenandoah Valley.

Work has been commenced at Luray, Va., and it is said the company intends to have the section from Luray to Front Royal, about 22 miles, completed this season.

Maryland Central.

The ordinance providing for the indorsement of $600,000 of this company's first-mortgage bonds by the city of Baltimore came up in the City Council recently and was laid over until next September. It was thought that this action will kill the measure.

Allegheny Valley—Eastern Extension.

The track has been laid to Brookville, Pa., 20 miles beyond New Bethlehem, the late terminus, and 41 miles from the junction with the main line at the mouth of Red Bank.

Galveston, Harrisburg & San Antonio.

The Texas papers report that the President of this company, Mr. Pierce, has offered to complete the road to San Antonio in 18 months, provided that town will pay a bonus of $100,000 on the completion of the road.

Utah Northern.

The branch line to Corinne, Utah, is completed and trains are running from Logan to Corinne. Work on the main line is progressing rapidly north toward Franklin.

Erie.

It is said that this company has secured a large tract of coal lands in the Lehigh Valley. Surveys are now being made for an extension of the Jefferson Branch from its present terminus at Carbondale, Pa., southward toward the Lehigh. It is said that the contracts, including that for a tunnel one-half mile long near Archibald, will be let about July 1, and that it is designed to have the work complete in two years.

Kansas Midland.

This company purposes building a railroad from Topeka, Kan., to Lawrence. It is proposed to purchase the road bed of the Lawrence & Topeka Railway Company as far as the same may be graded, and as far as practicable that company's right of way to a connection with the St. Louis, Lawrence & Denver road at Lawrence. The Kansas Pacific road already connects the two places.

Cairo & Fulton.

Track laying is being pushed forward rapidly. At last accounts the track had reached Rockport, Ark., 43 miles southwest of Little Rock and 19 miles beyond Benton, the late terminus. The grading is nearly completed to Fulton, and it is expected that there will be no delay in the track laying.

Indianapolis, Bloomington & Western.

Surveys are still being made for the Western Extension on both routes, that from Havana (the present terminus of the Extension) to Warsaw and from Havana to Quincy. No definite decision has been made as to the route, or, at least, none has been made public.

Railroad Legislation in Massachusetts.

Among the acts recently passed by the Massachusetts Legislature and signed by the Governor are the following:

Act authorizing the Boston, Clinton & Fitchburg Railroad Company to build a branch line to the State camp ground in Framingham.

Act giving a right of action against owners of railroads to persons who perform labor in or furnish materials for the construction of said roads.

Act providing for the discontinuance of the grade crossings of railroads in Somerville, Charlestown and Boston.

Act authorizing the Eastern Railroad Company to construct a freight track and to take land for freight purposes in Charlestown.

Act prohibiting leases or contracts between any two railroads each of which has a terminus in Boston.

Hannibal & Central Missouri.

A correspondent of the St. Louis *Republican*, writing from Hannibal, Mo., under date of June 9, says: "About two years since the Hannibal & Central Missouri Railroad, extending from Hannibal to Moberly, was leased to the Toledo, Wabash & Western Railway Company for ninety-nine years. Immediately after the lease was effected the latter company constructed a railroad and wagon bridge over the Mississippi River at this point 1,580 feet long, at a cost of about $650,000 including approaches, being the shortest and cheapest bridge over the Mississippi, and forming a strong contrast with the Quincy bridge without a wagon way, which cost about $2,000,000. In April last the Toledo, Wabash & Western Railway Company and the Missouri, Kansas & Texas Railroad Company made a contract by which the road from Hannibal to Moberly was transferred by the Toledo, Wabash & Western Railway Company to the Missouri, Kansas & Texas Railroad Company on condition that the Hannibal & Central Missouri road should form a part of the trunk line of the Missouri, Kansas & Texas Railroad, and Hannibal to be the permanent eastern terminus of the latter road, and the western terminus of the Toledo, Wabash & Western, and a further condition that the stock in the Hannibal & Central Missouri, held by Monroe County and Mason township in Marion County, should be transferred to the Missouri, Kansas & Texas Company. The stock referred to was promptly transferred, as required by the contract."

The Missouri, Kansas & Texas Company was to have taken possession of the road June 9.

Cedar Rapids & St. Louis.

A company by this name has been organized to build a railroad from Cedar Rapids, Ia., southwest to the State line in Davis county, a distance of about 110 miles. The headquarters of the company are Ottumwa, Ia., and its capital stock is to be $5,000,000.

Northern Pacific.

The Secretary of the Interior has decided that under the sixth section of the act of Congress granting lands to aid in the construction of the Northern Pacific Railroad, the filing of the map of the general route protects the company from preemption settlements within the granted limits, which in the Territories are 20 miles on each side of the line.

New York & Oswego Midland—New Jersey Division.

The car repair shops, which were lately removed to Pompton Junction, have been again removed, this time to Middletown, N. Y.

The milk business is increasing very largely. In the last half of May, an average of 790 cans per day was brought into Jersey City, the average receipts from the milk freights being about $475 per day.

Sioux City & Pacific.

Iowa papers report that the track of the branch line from Blair, Neb., to De Soto (about six miles) is being taken up. De Soto is on the Missouri, and the part of the road west of Blair is worked by the Omaha & Northwestern Company.

Buffalo, New York & Philadelphia.

At a meeting of the directors in Buffalo, N. Y., June 11, a resolution was passed authorizing the issue of $1,000,000 second mortgage bonds, convertible into stock.

St. Paul & Sioux City.

The old trestle-work east of Mendota, Minn., will be abandoned and a new track built near that place. The new track will be close to that of the Milwaukee & St. Paul. A gravel train with a force of fifty men is now filling in the marshy tracts between Mendota and Hamilton.

Lowell & Andover.

By the terms of the lease of this projected road to the Boston & Maine Company, the road is to be built as a first-class single-track road, and connections are to be made in Lowell with the tracks of the Lowell & Framingham and Boston & Lowell roads. The Boston & Maine Company is to keep the road in repair and pay, as rent, 3½ per cent. semi-annually on the cost, provided the cost does not exceed $750,000. The lease is for 99 years.

Pennsylvania & Delaware.

This road was opened for business from Delaware City, Del., to Landenberg, Pa., the crossing of the Wilmington & Western, June 20.

Gulf, Colorado & Santa Fe.

The charter of this company has become a law, and the company is shortly to be organized. The road is to run from Galveston, Tex., northwest through Columbia, Cameron and Belton, crossing the Texas & Pacific in Eastland County, and thence through the border counties and Young Territory to the Canadian River, and along that river to the State line, and thence to Santa Fe, New Mexico. There is also to be a branch from Mill Creek to Bastrop. The State grants sixteen sections of land per mile, the land to be conveyed as each section of ten miles is completed. The land must be sold one-fourth in eight, one-fourth in twelve, one-fourth in sixteen, and the rest in twenty years, and the company can only retain enough land for its own uses. The capital stock is to be $2,000,000, with privilege of increase to $7,000,000, and $200,000 must be subscribed before organization. The corporators are J. P. Palmer, Albert Somerville, P. J. Willis, J. C. Higgins, W. H. Ledbetter, J. L. Darrah, Leon Blum, A. C. McKeen, W. K. Little, E. Sterling, C. Robertson, Frank W. Latham, Thomas Allen, B. O'Connor, W. E. Scott, E. Pelot, J. S. Catlin, M. A. Bryan, Wm. Wagner, B. H. Batt, J. W. Carroll, J. L. D. Morrison, George Lawrence, Wm. R. Smith, N. B. Yard and C. E. Brousard. The office of the company is to be in Galveston.

Indianapolis, Cincinnati & Lafayette.

The receivers of this road, T. A. Morris and M. E. Ingalls, made their report to the United States Circuit Court in Indianapolis June 6. The report says that all the matured interest on all the several classes of bonds has been either paid or satisfactorily provided for, except a small portion not presented for payment. The outstanding indebtedness of the receivers, contracted in the course of the administration of the trust, is about as follows: 1. Current monthly expenses for May, $60,000, but the receivers say this will be met in whole by the receipts during the same time; 2. $125,000 expended for iron and bolts used in repairing the roadway; 3. $112,000 borrowed for the purpose of partially paying for cars and locomotives; 4. $160,000 unpaid balance due on 300 freight cars purchased. They hold in trust the following property and equipments required in the management of the trust: Locomotives, upon which $57,000 has been paid, tenders worth $156,000; cars upon which $83,000 has been paid. The receivers, in closing, say they will be enabled, by the permission and authority of the court, to provide for $297,000 of this outstanding indebtedness contracted in the execution of their trust by the advancement of that sum of money from John Kennedy, Joseph S. Fry and Samuel J. Broadwell, trustees of the stockholders of the company, in case the property held by the receivers and in which they have an interest to that amount, be turned over to them for security. The receivers are advised that it is contemplated between said railroad company and said trustees that the former shall reimburse the latter by means of an equipment-bond loan to be made by it, based upon said cars, locomotives and tenders. After the receipt and application of this $297,600, there will remain of the liabilities contracted by receivers $159,400, $60,000 of which is for current expenses of May, and which will be liquidated by receipts during the same month; the remaining $100,000 the railroad company will assume and pay as it matures. There are of bonds and stocks assets belonging to the trust sufficient to secure the payment of any unpaid liabilities contracted by the receivers, and to be assumed by the railroad company, if in the judgment of the court the same shall be held as security for such payment. In addition to these stocks and bonds, the receivers hold about $15,000 worth of coal, old iron rails worth $50,000, supplies for shop uses worth $5,000; wherefore, the purposes of said trust being virtually ended, the receivers ask instructions of the court as to the final disposition of the property in their hands, and that upon a final settlement of their accounts as receivers they may be discharged.

The court sitting at Indianapolis, June 11, reversed the order of the District Court and ordered that the proceedings in bankruptcy should be terminated upon this company continuing the deposit of the United States bonds in favor of Charles Dwight, and depositing with the Clerk of the District Court $50,000 of mortgage bonds of the Indianapolis, Cincinnati & Lafayette Railroad Company, of the issue of 1869, to secure any demands of the White Water Valley Railroad Company, and upon its giving other satisfactory security in the sum of $8,000 for the repayment of the sum paid by the White Water Valley Railroad Company to the Globe Bank, if the same should be alternately established as a valid claim against the Indianapolis, Cincinnati & Lafayette Railroad Company.

The District Court had ordered the termination of the proceedings in bankruptcy, but had made no provisions for securing the claims of the White Water Valley Railroad Company. All the claims against the company except those of Dwight and the White Water Valley Company have been bought up by trustees acting for the stockholders.

International.

Mr. G. A. Grow, President of this company, wrote a letter in response to questions asked during the late session of the Texas Legislature, intimating the willingness of the company to make a compromise on the question of the bonds in dispute between the company and the State. The compromise proposed was that the company, instead of receiving a subsidy in bonds on the whole proposed line of over 600 miles, should take a bond subsidy for 350 miles and 20 sections of land per mile for the balance.

The Legislature adjourned without final action, owing to a disagreement between the two houses.

Railroad Legislation in New York.

Among the acts passed near the close of the recent session of the New York Legislature, and since signed by the Governor, were the following:

An act to amend act authorizing the formation of railroad corporations and regulating the same, passed April 2, 1850.

An act for the improvement of the navigation of the Hudson River, and to make an appropriation therefor.

An act to compel Railroad Commissioners to give bonds.

An act to authorize the town of Liberty, Sullivan county, and the corporate village of Liberty in said county, to loan money and to issue bonds therefor, and to subscribe to the stock of the New York & Oswego Midland Railroad Company.

An act authorizing the construction of a railroad through certain streets in the city of Oswego.

Delaware, Lackawanna & Western—Morris & Essex Division.

Work on the new depot at Hoboken, to replace the one lately burned, is being pushed forward. The most troublesome part of the work, replacing the burned piles and flooring, is nearly done, and the superstructure can be commenced in a few days.

Considerable additions have been lately made to the equipment of the road, including a number of anthracite burning "mogul" locomotives from the Dickson Company at Scranton, Pa., and a number of new passenger coaches. The passenger coaches now built are very short, holding about 48 passengers. These short coaches are thought to be better adapted to the many short curves on the road. Work has been commenced on the new car shops at Hackettstown.

New York, Norfolk & Charleston.

The preliminary survey has been completed from Norfolk, Va., south as far as Elizabeth City, N. C., and the surveying parties are on the line from that place southwest to Hertford and Edenton.

Grand Rapids & Indiana.

About six miles of track has been laid north from the winter terminus (16 miles north of Fyfe Lake). The grading is nearly or quite completed for about 25 miles north of the end of the track, leaving some 25 miles of grading to be done to reach Bayfield, on Little Traverse Bay, to which point the road is to be completed this season.

North Pacific Coast.

Work on this road is progressing, and iron for 23 miles is on hand. The Saucelito Land Company has given all the land needed for depots, shops, etc., at Saucelito, the southern terminus. Messrs. A. K. Grimm & Co. are the contractors.

Bangor & Bucksport.

The city of Bangor, Me., has voted against issuing bonds to build a bridge over the Penobscot for this road.

Indiana & Illinois Central.

This road was opened for business from Montezuma, Ind., to Decatur, Ill., June 10, by an excursion over the line.

Texas & Pacific.

Two new stations have been opened beyond Longview, Gladewater, 77½ miles, and Hawkins, 93½ miles west of Shreveport.

On the western end of the line, the contract for the first 10 miles from San Diego has been let to A. P. Wood, late Assistant Engineer on the road.

Illinois & St. Louis Bridge.

The work of putting up the first arch is going on. The workmen commenced putting up the sixth length of steel ribs, or tubes, June 9. The steel work for the first arch is all ready, and the balance is being shipped from Pittsburgh as fast as possible.

Rhinebeck & Connecticut.

This company has executed a mortgage on its road for $800,000 to George T. Olyphant as trustee. The road is to extend from Rhinebeck, N. Y., on the Hudson opposite Rondout, east to a connection with the Connecticut Western near Millerton. It is being built in the interests of the Delaware & Hudson Canal Company to transport coal from Rondout (the northeast terminus of the Delaware & Hudson Canal) eastward.

Sioux City & Pembina.

The Sioux City (Iowa) *Times* says that a contract for the first 10 miles has been let, and that 10 miles more will be let this month.

New York Central & Hudson River.

The company asks proposals, until July 2 at noon, for $2,000,000 7 per cent. currency first-mortgage bonds, having 30 years to run, being a part of an authorized issue of $30,000,000 7 per cent. and £2,000,000 6 per cent. bonds. Bids must be for not less than $10,000 and must be accompanied by a certified check for five per cent. of the amount bid for. The bonds will be ready for delivery to the successful bidders July 10. The bonds will be coupon or registered, as desired, the former of $1,000 each, the latter of $5,000 and $10,000 each.

In advertising for the proposals, the company says that £2,000,000 of sterling 6 per cents. "have been placed in London at a price yielding upward of $110 currency, free of all expenses, for each $100 in gold involved." At the current price of gold, this would make the interest paid about 6.4 per cent. As this company has in New York better credit, perhaps, than any other railroad corporation, a great many bids and good prices may be expected.

California & Texas Construction Company.

"Goth," the Washington correspondent of the Chicago *Tribune*, writes to that paper: "The Construction Company of the Texas Pacific Railroad appears to have been a sell to entrap people of easy conscience and small capital. Seventy-five per cent. of the subscriptions have been called in, and the howl of the wounded and the despairing looks of the slain are piteous to see and hear. In this company the great Col. McComb had $100,000, ex-Gov. Cook, of Colorado, $50,000, and so on."